

Panorama Premier Variable Annuity

Issued by Massachusetts Mutual Life Insurance Company

Massachusetts Mutual Variable Annuity Separate Account 4

This prospectus describes the individual certificates issued under the Panorama Premier deferred group variable annuity contract offered by Massachusetts Mutual Life Insurance Company. We no longer sell the certificate. However, we continue to administer existing certificates. The certificate provides for accumulation of certificate value and annuity payments on a fixed and/or variable basis.

You, the participant, have a number of investment choices in the certificate. These investment choices include three fixed account options and one or more variable investment divisions (sub-accounts) of Massachusetts Mutual Variable Annuity Separate Account 4 (separate account). Each sub-account, in turn, invests in one of the following investment entities (funds). You bear the entire investment risk for all amounts you allocate to a sub-account.

AIM Variable Insurance Funds (Invesco Variable Insurance Funds)

Invesco V.I. Diversified Dividend Fund
Invesco V.I. Health Care Fund
Invesco V.I. Technology Fund

Fidelity® Variable Insurance Products Fund

Fidelity® VIP Contrafund® Portfolio

MML Series Investment Fund

MML Aggressive Allocation Fund
MML Balanced Allocation Fund
MML Blue Chip Growth Fund
MML Conservative Allocation Fund
MML Equity Income Fund
MML Equity Index Fund
MML Focused Equity Fund
MML Foreign Fund
MML Fundamental Growth Fund
MML Fundamental Value Fund
MML Global Fund

MML Growth & Income Fund
MML Growth Allocation Fund
MML Income & Growth Fund
MML Large Cap Growth Fund
MML Managed Volatility Fund
MML Mid Cap Growth Fund
MML Mid Cap Value Fund
MML Moderate Allocation Fund
MML Small Cap Growth Equity Fund
MML Small/Mid Cap Value Fund
MML Total Return Bond Fund

MML Series Investment Fund II

MML Blend Fund
MML Equity Fund
MML High Yield Fund
MML Inflation-Protected and Income Fund
MML Managed Bond Fund
MML Short-Duration Bond Fund
MML Small Cap Equity Fund
MML U.S. Government Money Market Fund

Oppenheimer Variable Account Funds

Oppenheimer Capital Appreciation Fund/VA
Oppenheimer Conservative Balanced Fund/VA
Oppenheimer Discovery Mid Cap Growth Fund/VA
Oppenheimer Global Fund/VA
Oppenheimer Global Strategic Income Fund/VA
Oppenheimer Government Money Fund/VA
Oppenheimer International Growth Fund/VA
Oppenheimer Main Street Fund®/VA
Oppenheimer Total Return Bond Fund/VA

PIMCO Variable Insurance Trust

PIMCO CommodityRealReturn® Strategy Portfolio

Voya Investors Trust

VY® Clarion Global Real Estate Portfolio

To learn more about the certificate, you can obtain a copy of the Statement of Additional Information (SAI), dated May 1, 2019. The prospectus and SAI are parts of the registration statement that we filed with the Securities and Exchange Commission (SEC). The SEC maintains a website (<http://www.sec.gov>) that contains the registration statement, material incorporated by reference, and other information regarding companies that file electronically with the SEC. The table of contents for the SAI is on page 42 of this prospectus.

For a free copy of the SAI, or for general inquiries, call our Service Center at (800) 272-2216 or write to our Service Center using the following address: MassMutual, Document Management Services – Annuities W360, P.O. Box 9067, Springfield, MA 01102-9067. (Overnight Mail Address: MassMutual, Document Management Services – Annuities W360, 1295 State Street, Springfield, MA 01111-0111)

Beginning January 1, 2021, we will no longer send you paper copies of fund shareholder reports (Reports) unless you specifically request paper copies from us. The Reports will be available online. We will notify you by mail each time the Reports are posted. The notice will provide the website link(s) to access the Reports as well as instructions for requesting paper copies. If you wish to continue receiving your Reports in paper free of charge from us, please call (866) 444-2450. Your election to receive the Reports in paper will apply to all funds available with your contract. If you have already elected to receive the Reports electronically, you will not be affected by this change and need not take any action. If you wish to receive the Reports and other SEC disclosure documents from us electronically, follow the instructions provided on the inside front cover of this prospectus.

The certificate:

- is not a bank or credit union deposit or obligation.
- is not FDIC or NCUA insured.
- is not insured by any federal government agency.
- is not guaranteed by any bank or credit union.
- may go down in value.
- provides guarantees that are subject to our financial strength and claims-paying ability.

The SEC has not approved or disapproved the certificate or determined that this prospectus is accurate or complete. Any representation that it has is a criminal offense.

This prospectus is not an offer to sell the certificate in any jurisdiction where it is illegal to offer the certificate nor is it an offer to sell the certificate to anyone to whom it is illegal to offer the certificate.

Please read this prospectus before investing. You should keep it for future reference. It contains important information about the Panorama Premier Variable Annuity.

Effective May 1, 2019

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Index of Special Terms

We have tried to make this prospectus as readable and understandable for you as possible. By the very nature of the certificate, however, certain technical words or terms are unavoidable. We have identified the following as some of these words or terms.

The page that is indicated here is where we believe you will find the best explanation for the word or term.

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Contacting the Company

You may contact us by calling the MassMutual Customer Service Center (our Service Center) at (800) 272-2216 Monday through Friday between 8 a.m. and 8 p.m. Eastern Time. You may also contact us by visiting www.MassMutual.com/contact-us. Additionally, you may write to our Service Center using the following address: MassMutual, Document Management Services – Annuities W360, P.O. Box 9067, Springfield, MA 01102-9067 or to our overnight mail address at MassMutual, Document Management Services – Annuities W360, 1295 State Street, Springfield, MA 01111-0111.

Overview

The following is intended as a summary. Please read each section of this prospectus for additional detail.

We no longer sell the Panorama Premier variable annuity certificate. However, we continue to administer existing certificates, and you may continue making additional purchase payments to your certificate, subject to certain restrictions. See “Additional Purchase Payments.”

The annuity certificate is an ownership interest issued by “us,” Massachusetts Mutual Life Insurance Company (“MassMutual” or the “Company”), to “you,” the participant, under the group deferred variable annuity contract. This annuity certificate is a contract between the participant and MassMutual. The certificate is intended for retirement savings or other long-term investment purposes. In exchange for your purchase payments, we agree to pay you an income when you choose to receive it. You designate the date on which the income period begins. According to your certificate, this date must be at least five years from when you purchase the certificate. However, we currently allow you to select a date that is at least 30 days from when you purchase the certificate.

The certificate has two phases – the accumulation phase and the income phase. Your certificate is in the accumulation phase until you decide to begin receiving annuity payments. During the accumulation phase we provide a death benefit. Once you begin receiving annuity payments, your certificate enters the income phase.

Certificate Type	<p>This prospectus describes the individual certificates issued under the Panorama Premier deferred group variable annuity contract. The certificate provides for accumulation of certificate value and annuity payments on a fixed and/or variable basis. We use the terms “certificate” and “contract” interchangeably to refer to the individual certificate, and we use the terms “participant” and “contract owner” interchangeably to refer to the participant.</p> <p>The certificate is called a variable deferred annuity because you can choose to allocate your purchase payments among various sub-accounts. Certificate value allocated to a sub-account is not guaranteed. It is possible to lose your certificate value allocated to any of the sub-accounts. If you allocate certificate value to the sub-accounts, the amount you are able to accumulate in your certificate depends upon the performance of the sub-accounts you select.</p>
The Prospectus and the Certificate	<p>The prospectus and SAI describe all material terms and features of your certificate. Certain non-material provisions of your certificate may be different than the general description in the prospectus and the SAI, and certain riders may not be available because of legal requirements in your state. See your certificate for specific variations since any such state variation will be included in your certificate or in riders or endorsements attached to your certificate.</p>
Annuity Options	<p>We make annuity payments based on the annuity option you elect. When you elect an annuity option you make a number of choices, including, but not limited to: duration, number of payees, payments to beneficiaries, and whether payments will be variable and/or fixed payments. See “The Income Phase.”</p>
Investment Choices	<p>You can choose to allocate your purchase payments among various investment choices. Your investment choices include a number of sub-accounts and three fixed accounts. See “Investment Choices.”</p>
Withdrawals	<p>Subject to certain restrictions, you may periodically make partial withdrawals of your certificate value. If you make a full withdrawal of your certificate value, all your rights under the certificate will be terminated. Income taxes, tax penalties and a contingent deferred sales charge may apply to any withdrawal you request. See “Withdrawals,” “Expenses – Contingent Deferred Sales Charge” and “Taxes.”</p>
Transfers	<p>Subject to certain restrictions, you may periodically transfer certificate value among available investment choices. See “Transfers and Transfer Programs.”</p>
Death Benefit	<p>A beneficiary may receive a benefit in the event of your death prior to the income phase. Once the income phase commences, payments upon death may be available to beneficiaries depending on the annuity option elected. See “Death Benefit” and “The Income Phase.”</p>

Fees	Your certificate value will be subject to certain fees. These charges will be reflected in your certificate value and may be reflected in any annuity payments you choose to receive from the certificate. See “Expenses” and “Table of Fees and Expenses.”
Taxation	The Internal Revenue Code of 1986, as amended (IRC), has certain rules that apply to the certificate. These tax treatments apply to earnings from the certificate, withdrawals, death benefits and annuity options. See “Taxes.”
Tax Deferral	You are generally not taxed on certificate earnings until you take money from your certificate. This is known as tax deferral. Tax deferral is automatically provided by tax-qualified retirement plans. There is no additional tax deferral provided when a variable annuity contract is used to fund a tax-qualified retirement plan. Investors should only consider buying a variable annuity to fund a qualified plan for the annuity’s additional features such as lifetime income payments and death benefit protection.
Right to Cancel Your Certificate	You have a right to examine your certificate. If you change your mind about owning your certificate, you can generally cancel it within ten calendar days after receiving it. However, this time period may vary by state. See “Right to Cancel Your Certificate.”
Our Claims-Paying Ability	Any guarantees we make under the contract are subject to our financial strength and claims-paying ability. See “Other Information – Our Ability to Make Payments Under the Contract.”

Table of Fees and Expenses

The following tables describe the fees and expenses you pay when buying, owning, and surrendering the certificate. In addition to other fees and expenses shown below, premium taxes may also apply, but are not reflected below.

I. The first table describes the fees and expenses that you will pay at the time that you transfer the value between investment choices, or surrender the certificate. We do not deduct a sales charge when we receive a purchase payment, but we may assess a contingent deferred sales charge as noted below.

Participant Transaction Expenses	Current	Maximum						
Transfer Fee <i>During the Accumulation Phase</i>	\$0	12 free transfers per calendar year; thereafter, the lesser of \$20 or 2% of the amount transferred.						
Contingent Deferred Sales Charge <i>(as a percentage of purchase payment withdrawn or applied to certain annuity options ¹⁾)</i>	7%	7%						
Contingent Deferred Sales Charge Schedule								
Year Since Purchase Payment was Accepted	1	2	3	4	5	6	7	8 and later
Percentage	7%	6%	5%	4%	3%	2%	1%	0%

II. The next table describes fees and expenses you will pay periodically during the time you own the certificate, not including underlying fund fees and expenses.

Periodic Certificate Charges	Current	Maximum
Annual Certificate Maintenance Charge	\$ 30 ²	\$ 60 ²
Separate Account Annual Expenses <i>(as a percentage of average account value in the separate account on an annualized basis)</i>		
Mortality and Expense Risk Charge	1.25%	1.25%
Administrative Charge	0.15%	0.25%
Total Separate Account Annual Expenses	1.40%	1.50%

Additional Participant Expenses for Elected Options

If you are under age 80 when we issue your certificate, for an additional charge you can elect the Ratchet Death Benefit as a replacement for the Basic Death Benefit which you automatically receive when you purchase the Panorama Premier certificate.

Elected Options	Current (annual rate)	Maximum (annual rate)
Ratchet Death Benefit <i>(deducted quarterly from your certificate value)</i>		
if you were age 60 or less when we issued the certificate	0.15% ³	0.35% ⁴
if you were age 61 through 70 when we issued the certificate	0.15% ³	0.50% ⁴
if you were age 71 or older when we issued the certificate	0.15% ³	0.70% ⁴

1 See Annuity Options E and F in "The Income Phase – Annuity Options."

2 Currently waived if certificate value is \$50,000 or greater when we are to assess the charge, although we reserve the right to raise this to \$100,000 as stated in the certificate.

3 The charge is a percentage on an annual basis of the daily value of your certificate value allocated to the funds and the fixed accounts, unless that charge exceeds the maximum charge, in which case the charge is the maximum charge.

4 The charge is a percentage on an annual basis of the daily value of your certificate value allocated to the funds.

Annual Fund Operating Expenses

While you own the certificate, if your assets are invested in any of the sub-accounts, you will be subject to the fees and expenses charged by the fund in which that sub-account invests. The table below shows the minimum and maximum total operating expenses charged by any of the funds, expressed as a percentage of average net assets, for the year ended December 31, 2018 (before any waivers or reimbursements).¹ More detail concerning each fund's fees and expenses that you may periodically be charged during the time that you own the certificate is contained in each fund prospectus. Current and future expenses may be higher or lower than those shown.

Charge	Minimum	Maximum
Total Annual Fund Operating Expenses that are deducted from fund assets, including management fees, distribution, and/or 12b-1 fees, and other expenses.	0.43%	2.17%

¹ *The fund expenses used to prepare this table were provided to us by the funds. We have not independently verified such information provided to us by funds that are not affiliated with us.*

The information above describes the fees and expenses you pay related to the certificate. For information on compensation we may receive from the funds and their advisers and sub-advisers, see "Investment Choices – Compensation We Receive from Funds, Advisers and Sub-Advisers." For information on compensation we pay to broker-dealers selling the certificate, see "Other Information – Distribution."

Examples Using Current and Maximum Expenses

These Examples are intended to help you compare the cost of investing in the certificate with the cost of investing in other variable annuity contracts. These costs include participant transaction expenses, certificate fees, separate account annual expenses, and fund fees and expenses.

Example I assumes that you withdraw all your certificate value at the end of each year shown.

Example II assumes you do not withdraw any certificate value at the end of each year shown, or that you decide to begin the income phase at the end of each year shown and we do not deduct a contingent deferred sales charge. (Currently the income phase is not available until 30 days after you purchase your certificate.)

Both Example I and Example II assume:

- that you invest \$10,000 in the certificate for the time periods indicated,
- that you allocate it to a sub-account that has a 5% gross return each year,
- that you elected the Ratchet Death Benefit and you were at least age 71, and not yet age 80 or older when we issued the certificate,
- that either the current or maximum fees and expenses in the “Table of Fees and Expenses” apply, and
- that you selected one of two sub-accounts:
 - 1) the one that invests in the fund with the maximum total operating expenses; or
 - 2) the one that invests in the fund with the minimum total operating expenses.

Examples Using Current Expenses. Based on the above assumptions, your costs would be as shown in the following table. Your actual costs may be higher or lower.

Years	Example I				Example II			
	1	3	5	10	1	3	5	10
Sub-Account with maximum total operating expenses	\$1,015	\$1,610	\$2,216	\$3,976	\$376	\$1,142	\$1,927	\$3,976
Sub-Account with minimum total operating expenses	\$ 853	\$1,120	\$1,371	\$2,312	\$202	\$ 624	\$1,071	\$2,312

Examples Using Maximum Expenses. Based on the above assumptions, your costs would be as shown in the following table. Your actual costs may be higher or lower.

Years	Example I				Example II			
	1	3	5	10	1	3	5	10
Sub-Account with maximum total operating expenses	\$1,079	\$1,800	\$2,527	\$4,559	\$445	\$1,342	\$2,248	\$4,559
Sub-Account with minimum total operating expenses	\$ 917	\$1,316	\$1,717	\$3,004	\$271	\$ 831	\$1,417	\$3,004

The examples using current expenses reflect the annual certificate maintenance charge of \$30 as an annual charge of 0.04%.

The examples using maximum expenses reflect the annual certificate maintenance charge of \$60 as an annual charge of 0.08%.

The examples do not reflect any premium taxes. However, premium taxes may apply.

The examples should not be considered a representation of past or future expenses. Your actual expenses may be higher or lower than those shown in the examples. The assumed 5% annual rate of return is hypothetical. Actual returns may be greater or less than the assumed hypothetical return.

There is an accumulation unit value history in “Appendix A – Condensed Financial Information.”

There is information concerning compensation payments we make to sales representatives in connection with the sale of the certificates in “Other Information – Distribution.”

The Company

In this prospectus, the “Company,” “we,” “us,” and “our” refer to Massachusetts Mutual Life Insurance Company (MassMutual). MassMutual and its domestic life insurance subsidiaries provide individual and group life insurance, disability insurance, individual and group annuities and guaranteed interest contracts to individual and institutional customers in all 50 states of the U.S., the District of Columbia and Puerto Rico. Products and services are offered primarily through the Company’s distribution channels: MassMutual Financial Advisors, Direct to Consumer, Institutional Solutions and Workplace Solutions.

MassMutual is organized as a mutual life insurance company. MassMutual’s home office is located at 1295 State Street, Springfield, Massachusetts 01111-0001.

Ownership

Contract Owner

The contract owner is the person or non-natural person who maintains the ownership rights stated in the contract that are not delegated to the participants. The owner of the contract is usually an employer, trustee or other sponsor of a group that is comprised of participants. If the contract is purchased as part of an employee benefit plan, the plan may govern which ownership rights are maintained by the contract owner and which are delegated to participants.

Participant

In this prospectus, “you” and “your” refer to the participant. The participant is named at time of application. The participant can be an individual or a non-natural person (e.g., a corporation, limited liability company, partnership or certain other entities). We will not issue a certificate to you if you have passed age 85 as of the date we proposed to issue the certificate.

If your certificate is non-qualified and owned by a non-natural person, the certificate will generally not be treated as an annuity for tax purposes. This means that gain in the certificate will be taxed each year while the certificate is in the accumulation phase. This treatment is not generally applied to a certificate held by a trust or other entity as an agent for a natural person. Before purchasing a certificate to be owned by a non-natural person or before changing ownership on an existing certificate that will result in it being owned by a non-natural person, you should consult a tax adviser to determine the tax impact. See “Taxes – Non-Natural Owner.”

As the participant of the certificate, you exercise all rights under the certificate. The participant names the beneficiary. You may change the participant of the certificate at any time prior to the annuity date by sending written authorization on our form, in good order, to our Service Center. If you change the participant, the change is subject to our approval. Changing the participant may result in tax consequences. On and after the annuity date, you continue as the participant.

Certificates under qualified plans, including section 457 deferred compensation plans, generally must be held by the plan sponsor or plan trustee. Except for TSAs, Keogh plans, and IRAs, an individual cannot be the participant under a certificate held to fund a qualified plan. Therefore, the individuals covered by the qualified plan have no ownership rights.

Joint Participant

Non-qualified certificates can be owned by joint participants. Unless prohibited by state law, only you and your spouse can be joint participants. We will not issue a certificate to you if either proposed joint participant has passed age 85 as of the date we proposed to issue the certificate. If there are joint owners, we require authorization from both joint owners for all transactions.

Annuitant

The annuitant is the person on whose life we base annuity payments. You designate the annuitant at the time of application. We will not issue a certificate to you if the proposed annuitant has passed age 85 as of the date we proposed to issue the certificate. You may change the annuitant before the annuity date, subject to our approval. However, the annuitant may not be changed on a certificate owned by a non-natural person unless the certificate was issued under a plan pursuant to IRC Section 401(a), 408(a), 408(b) or 408A. We will use the age of the annuitant to determine all applicable benefits under a certificate owned by a non-natural person.

Beneficiary

The beneficiary is the person(s) or entity you name to receive any death benefit. You name the beneficiary at the time of application. You may change the beneficiary at any time before you die. To change an irrevocable beneficiary, we must receive written authorization on our form in good order at our Service Center from the irrevocable beneficiary.

If you are married and your certificate is issued under an ERISA plan, your ability to name a primary beneficiary other than your spouse is restricted.

Beneficiary IRA

Beneficiary, Inherited, Legacy or “Stretch” IRAs are all terms used to describe an IRA that is used exclusively to distribute death proceeds of an IRA or other qualified investment to the beneficiary over that beneficiary’s life expectancy in order to meet the required minimum distribution (RMD) rules. Upon the contract owner’s death under an IRA or other qualified contract, a beneficiary(ies) may generally establish a Beneficiary IRA by either purchasing a new annuity contract or in some circumstances, by electing the Beneficiary IRA payout option under the current contract. Until withdrawn, amounts in a Beneficiary IRA or other qualified contract continue to be tax deferred. Amounts withdrawn each year, including amounts that are required to be withdrawn under the RMD rules, are subject to tax. For a list of the eligibility requirements/restrictions, see “Death Benefit – Beneficiary IRA Election.”

Age

How We Determine Age of Annuitant, Participant and Beneficiary

In this prospectus the term “age,” except when discussed in regards to specific tax provisions, is defined as “insurance age,” which is a person’s age on his/her birthday nearest the date for which the age is being determined. This means we calculate your age based on your nearest birthday, which could be either your last birthday or your next. For example, age 80 is generally the period of time between age 79 years, 6 months and 1 day and age 80 and 6 months.

Additional Purchase Payments

We no longer sell the Panorama Premier variable annuity certificate. However, we do continue to administer existing certificates, and you may continue making additional purchase payments to your certificate, subject to the limits described in this section.

Purchase Payments

The minimum amount we accepted for an initial purchase payment was:

- \$5,000 when the certificate was bought as a non-qualified certificate; or
- \$2,000 if you bought the certificate as part of an IRA (Individual Retirement Annuity), 401(k) or other qualified plan.

If, when you applied for your certificate, you elected to make purchase payments under our automatic investment plan option, we allowed you to satisfy the minimum initial payment requirement by making 12 consecutive monthly payments of as little as:

- \$416.66 for a non-qualified certificate, or
- \$166.66 for a qualified certificate.

Additional payments of less than \$250 are subject to our approval.

The maximum amount of cumulative purchase payments we accept without our prior approval is based on your age when we issued the certificate. The maximum amount is:

- \$1 million up to age 75; or
- \$500,000 if older than age 75.

If the participant is not a natural person, these purchase payment limits will apply to the annuitant’s age. If there are joint participants, age refers to the oldest participant.

Age is as of the nearest birthday. For example, age 80 is generally the period of time between age 79 years, 6 months and 1 day and age 80 and 6 months. See “Age.”

You can make additional purchase payments:

- by mailing a check that clearly indicates your name and certificate number to our lockbox:

First Class Mail

MassMutual Panorama Premier NY/NJ
Annuity Payment Services
MassMutual P.O. Box 74908
Chicago, IL 60675-4908

Overnight Mail

MassMutual Panorama Premier NY/NJ
Annuity Payment Services
350 North Orleans Street
Receipt & Dispatch, 8th Floor
Suite 4908
Chicago, IL 60654

- by Wire Transfer
JP Morgan Chase Bank
New York, New York
ABA #021000021
MassMutual Account #323956297
Ref: Annuity Certificate #
Name: (Your Name)

You may also send purchase payments to our Service Center. We have the right to reject any application or purchase payment.

Automatic Investment Plan (AIP). Under the AIP, you may authorize us to periodically draw funds from an account of your choosing (restrictions may apply) for the purpose of making purchase payments to your certificate. Contact our Service Center for information regarding setting up an AIP and any restrictions regarding use of the AIP.

Allocation of Purchase Payments

When you purchased your certificate, we applied your purchase payment among the investment choices according to the allocation instructions you provided. If you make additional purchase payments and do not provide new allocation instructions, we will apply each according to the allocation instructions we have on record.

Once we receive your initial purchase payment and the necessary information in good order at our Service Center or lockbox, we will issue your certificate and apply your initial purchase payment within two business days. If you do not give us all of the information we need, we will notify you. When we receive all of the necessary information, we will then apply your initial purchase payment within two business days. If for some reason we are unable to complete this process within five business days, we will either send back your money or get your permission to keep it until we receive all of the necessary information.

If you add more money to your certificate by making additional purchase payments, we will credit these amounts to your certificate on the business day we receive them and all necessary information in good order at our Service Center or lockbox. If we receive your purchase payment at our Service Center or lockbox on a non-business day or after the business day closes, we will credit the amount to your certificate effective the next business day. Our business day closes when the New York Stock Exchange (NYSE) closes, usually 4:00 p.m. Eastern Time.

Right to Cancel Your Certificate

You have a right to examine your certificate. If you change your mind about owning your certificate, you can cancel it within ten calendar days after receiving it. When you cancel the certificate within this time period, we will not assess a contingent deferred sales charge. You will receive your certificate value as of the business day we receive your certificate and your written request in good order at our Service Center, and your certificate will be terminated. If you purchase the certificate as an IRA, we will return the greater of your purchase payments less any withdrawals you took, or the certificate value.

Investment Choices

Choose Investment Choices Appropriate for You. When electing among your available investment choices consider your circumstances, investment goals, financial situation and risk tolerance. After you elect investment choices for your initial purchase payment, you should monitor and periodically re-evaluate your allocations to determine if they are still appropriate. Through the certificate we offer a number of investment choices, but we do not recommend or endorse any particular investment choice and we do not provide investment advice. Because investment risk is borne by you, carefully consider your investment choice elections.

Understand the Risks Associated with Your Investment Choices. If your certificate value is allocated to a fund, your certificate value will be influenced by the investment performance of that fund. You will want to read the fund prospectus, especially the section discussing the risks of investing in the fund. We will deliver current fund prospectuses and/or current summary fund prospectuses to you. You may also contact our Service Center to request current fund prospectuses and summary fund prospectuses. Summary fund prospectuses for certain funds may be unavailable.

Be Informed. Read this prospectus. Also review information about the funds: the fund prospectus, statement of additional information, annual report and semiannual report.

The Separate Account

We established Massachusetts Mutual Variable Annuity Separate Account 4 (separate account) as a separate account under Massachusetts law on July 9, 1997. The separate account is registered with the SEC as a unit investment trust under the Investment Company Act of 1940 (1940 Act).

The separate account holds the assets that underlie the certificates, except those assets allocated to our general account. We keep the separate account assets separate from the assets of our general account and other separate accounts. The separate account is divided into sub-accounts, each of which invests exclusively in a single investment choice.

We own the assets of the separate account. We credit gains to, or charge losses against, the separate account, whether or not realized, without regard to the performance of other investment accounts. The separate account's assets may not be used to pay any of our liabilities other than those arising from the certificates. If the separate account's assets exceed the required reserves and other liabilities, we may transfer the excess to our general account. The obligations of the separate account are not our generalized obligations and will be satisfied solely by the assets of the separate account.

The Funds

The following funds are available as investment choices under the certificate. If your certificate value is allocated to a fund, your certificate value will be influenced by the investment performance of that fund.

These funds are only available to insurance company separate accounts and qualified retirement plans, are not available for purchase directly by the general public, and are not the same as other mutual fund portfolios with very similar or nearly identical names and investment goals and policies that are sold directly to the public. While a fund may have many similarities to these other publicly available mutual funds, you should not expect the investment results of the fund to be the same as the investment results of those publicly available mutual funds. We do not guarantee or make any representation that the investment results of the funds will be comparable to the investment results of any other mutual fund, even a mutual fund with the same investment adviser or manager.

Fund Type	Investment Funds in Which the Sub-Accounts Purchase Shares	Investment Fund's Adviser and Sub-Adviser
<i>Asset Allocation</i>		
	MML Aggressive Allocation Fund (Initial Class) ¹	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> N/A
	MML Balanced Allocation Fund (Initial Class) ¹	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> N/A
	MML Conservative Allocation Fund (Initial Class) ¹	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> N/A
	MML Growth Allocation Fund (Initial Class) ¹	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> N/A
	MML Moderate Allocation Fund (Initial Class) ¹	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> N/A
<i>Money Market</i>		
	MML U.S. Government Money Market Fund (Initial Class) ²	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Barings LLC
	Oppenheimer Government Money Fund/VA (Non-Service) ^{2, 3}	<i>Adviser:</i> OFI Global Asset Management, Inc. <i>Sub-Adviser:</i> OppenheimerFunds, Inc.
<i>Fixed Income</i>		
	MML High Yield Fund (Service Class I)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Barings LLC
	MML Inflation-Protected and Income Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Barings LLC
	MML Managed Bond Fund (Service)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Barings LLC
	MML Short-Duration Bond Fund (Service Class I)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Barings LLC
	MML Total Return Bond Fund (Service Class I)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Metropolitan West Asset Management, LLC
	Oppenheimer Global Strategic Income Fund/VA (Non-Service)	<i>Adviser:</i> OFI Global Asset Management, Inc. <i>Sub-Adviser:</i> OppenheimerFunds, Inc.
	Oppenheimer Total Return Bond Fund/VA (Non-Service) ⁴	<i>Adviser:</i> OFI Global Asset Management, Inc. <i>Sub-Adviser:</i> OppenheimerFunds, Inc.

Fund Type	Investment Funds in Which the Sub-Accounts Purchase Shares	Investment Fund's Adviser and Sub-Adviser
Balanced		
	MML Blend Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Barings LLC
	Oppenheimer Conservative Balanced Fund/VA (Non-Service) ⁵	<i>Adviser:</i> OFI Global Asset Management, Inc. <i>Sub-Adviser:</i> OppenheimerFunds, Inc.
Large Cap Value		
	MML Equity Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Advisers:</i> OppenheimerFunds, Inc. and Brandywine Global Investment Management, LLC
	MML Equity Income Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> T. Rowe Price Associates, Inc.
	MML Fundamental Value Fund (Service Class I)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Boston Partners Global Investors, Inc.
	MML Income & Growth Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Barrow, Hanley, Mewhinney & Strauss, LLC
Large Cap Blend		
	Fidelity [®] VIP Contrafund [®] Portfolio (Initial Class)	<i>Adviser:</i> Fidelity Management & Research Company <i>Sub-Adviser:</i> FMR Co., Inc.
	Invesco V.I. Diversified Dividend Fund (Series I)	<i>Adviser:</i> Invesco Advisers, Inc. <i>Sub-Adviser:</i> N/A
	MML Equity Index Fund (Class I)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Northern Trust Investments, Inc.
	MML Focused Equity Fund (Service Class I)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Wellington Management Company LLP
	MML Growth & Income Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Massachusetts Financial Services Company
	Oppenheimer Main Street Fund [®] /VA (Non-Service)	<i>Adviser:</i> OFI Global Asset Management, Inc. <i>Sub-Adviser:</i> OppenheimerFunds, Inc.
Large Cap Growth		
	MML Blue Chip Growth Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> T. Rowe Price Associates, Inc.
	MML Fundamental Growth Fund (Service Class I)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Wellington Management Company LLP
	MML Large Cap Growth Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> Loomis, Sayles & Company, L.P.
	Oppenheimer Capital Appreciation Fund/VA (Non-Service)	<i>Adviser:</i> OFI Global Asset Management, Inc. <i>Sub-Adviser:</i> OppenheimerFunds, Inc.
Small/Mid Cap Value		
	MML Mid Cap Value Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> American Century Investment Management, Inc.
	MML Small/Mid Cap Value Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> AllianceBernstein L.P.
Small/Mid Cap Blend		
	MML Small Cap Equity Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> OppenheimerFunds, Inc.
Small/Mid Cap Growth		
	MML Mid Cap Growth Fund (Initial Class)	<i>Adviser:</i> MML Investment Advisers, LLC <i>Sub-Adviser:</i> T. Rowe Price Associates, Inc.

Fund Type	Investment Funds in Which the Sub-Accounts Purchase Shares	Investment Fund's Adviser and Sub-Adviser
<i>Small/Mid Cap Growth (continued)</i>		
	MML Small Cap Growth Equity Fund (Initial Class)	Adviser: MML Investment Advisers, LLC Sub-Adviser: Wellington Management Company LLP
	Oppenheimer Discovery Mid Cap Growth Fund/VA (Non-Service)	Adviser: OFI Global Asset Management, Inc. Sub-Adviser: OppenheimerFunds, Inc.
<i>International/Global</i>		
	MML Foreign Fund (Initial Class)	Adviser: MML Investment Advisers, LLC Sub-Adviser: Templeton Investment Counsel, LLC
	MML Global Fund (Class II)	Adviser: MML Investment Advisers, LLC Sub-Adviser: Massachusetts Financial Services Company
	Oppenheimer Global Fund/VA (Non-Service)	Adviser: OFI Global Asset Management, Inc. Sub-Adviser: OppenheimerFunds, Inc.
	Oppenheimer International Growth Fund/VA (Non-Service)	Adviser: OFI Global Asset Management, Inc. Sub-Adviser: OppenheimerFunds, Inc.
<i>Specialty</i>		
	Invesco V.I. Health Care Fund (Series I)	Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A
	Invesco V.I. Technology Fund (Series I)	Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A
	MML Managed Volatility Fund (Initial Class)	Adviser: MML Investment Advisers, LLC Sub-Adviser: Gateway Investment Advisers, LLC
	PIMCO CommodityRealReturn [®] Strategy Portfolio (Advisor Class)	Adviser: Pacific Investment Management Company LLC Sub-Adviser: N/A
	VY [®] Clarion Global Real Estate Portfolio (Class S)	Adviser: Voya Investments, LLC Sub-Adviser: CBRE Clarion Securities LLC

- 1 *These are fund-of-funds investment choices. They are known as fund-of-funds because they invest in other underlying funds. A fund offered in a fund-of-funds structure may have higher expenses than a direct investment in its underlying funds because a fund-of-funds bears its own expenses and indirectly bears its proportionate share of expenses of the underlying funds in which it invests.*
- 2 *You could lose money by investing in the fund. Although the fund seeks to preserve the value of your investment at \$1.00 per share, it cannot guarantee it will do so. An investment in the fund is not insured or guaranteed by the Federal Deposit Insurance Corporation or any other government agency. The fund's sponsor has no legal obligation to provide financial support to the fund, and you should not expect that the sponsor will provide financial support to the fund at any time. The yield of this fund may become very low during periods of low interest rates. After deduction of separate account charges, the yield in the sub-account that invests in this fund could be negative.*
- 3 *Unavailable in certificates issued on or after January 19, 2008.*
- 4 *Effective May 1, 2009 and after, you may not allocate any new money to this fund via purchase payments or transfers.*
- 5 *Unavailable in certificates issued on or after April 30, 2012.*

There is no assurance that the funds will achieve their stated objective. The fund prospectuses contain more detailed information about the funds. We will deliver current fund prospectuses and/or current summary fund prospectuses to you. You may also contact our Service Center to request current fund prospectuses and summary fund prospectuses. Summary fund prospectuses for certain funds may be unavailable. You should read the information contained in the fund prospectuses carefully before investing.

Addition, Removal, Closure or Substitution of Funds

We have the right to change the funds offered through the certificate, but only as permitted by law. If the law requires, we will also get your approval and the approval of any appropriate regulatory authorities. Changes may only impact certain certificate owners. Examples of possible changes include: adding new funds or fund classes; removing existing funds or fund classes; closing existing funds or fund classes; or substituting a fund with a different fund. New or substitute funds may have different fees and expenses. We will not add, remove, close or substitute any shares attributable to your interest in a sub-account without notice to you and prior approval of the SEC, to the extent required by applicable law. We reserve the right to transfer separate account assets to another separate account that we determine to be associated with the class of certificates to which your certificate belongs.

Conflicts of Interest. The funds available with the certificate may also be available to registered separate accounts offering variable annuity and variable life products of other affiliated and unaffiliated insurance companies, as well as to the separate account and other separate accounts of MassMutual. Although we do not anticipate any disadvantages to this, it is possible that a

material conflict may arise between the interests of the separate account and one or more of the other separate accounts participating in the funds. A conflict may occur, for example, as a result of a change in law affecting the operations of variable life and variable annuity separate accounts, differences in the voting instructions of the owners and payees and those of other insurance companies, or some other reason. In the event of a conflict of interest, we will take steps necessary to protect owners and payees, including withdrawing the separate account from participation in the funds involved in the conflict or substituting shares of other funds.

Compensation We Receive from Funds, Advisers and Sub-Advisers

Compensation We Receive from Advisers and Sub-Advisers. We and certain of our insurance affiliates receive compensation from the advisers and sub-advisers to some of the funds. We may use this compensation to pay expenses that we incur in promoting, issuing, distributing and administering the certificate and, providing services, on behalf of the funds, in our role as intermediary to the funds. The amount of this compensation is determined by multiplying a specified annual percentage rate by the average net assets held in that fund that are attributable to the variable annuity and variable life insurance products issued by us and our affiliates that offer the particular fund (MassMutual's variable contracts). These percentage rates differ, but currently do not exceed 0.25%. Some advisers and sub-advisers pay us more than others; some do not pay us any such compensation.

The compensation may not be reflected in a fund's expenses because this compensation may not be paid directly out of a fund's assets. These payments also may be derived, in whole or in part, from the advisory fee deducted from fund assets. Participants, through their indirect investment in the funds, bear the costs of these advisory fees (see the funds' prospectuses for more information).

In addition, we may receive fixed dollar payments from the advisers and sub-advisers to certain funds so that the adviser and sub-adviser can participate in sales meetings conducted by MassMutual. Attending such meetings provides advisers and sub-advisers with opportunities to discuss and promote their funds. **For a list of the funds whose advisers and sub-advisers currently pay such compensation, visit www.MassMutual.com/legal/compensation-arrangements or call our Service Center at the number shown on page 1 of this prospectus.**

Compensation We Receive from Funds. We and certain of our affiliates also receive compensation from certain funds pursuant to Rule 12b-1 under the 1940 Act. This compensation is paid out of the fund's assets and may be as much as 0.25% of the average net assets of an underlying fund which are attributable to MassMutual's variable contracts. An investment in a fund with a 12b-1 fee will increase the cost of your investment in the certificate.

Compensation and Fund Selection. When selecting the funds that will be available with MassMutual's variable contracts we consider each fund's investment strategy, asset class, manager's reputation, and performance. We also consider the amount of compensation that we receive from the funds, their advisers, sub-advisers, or their distributors. The compensation that we receive may be significant and we may profit from this compensation. Additionally, we offer certain funds through the contract at least in part because they are managed by us or an affiliate.

The Fixed Accounts

We offer three fixed accounts as investment choices: the fixed accounts for Dollar Cost Averaging (DCA Fixed Accounts) and The Fixed Account (collectively, the fixed accounts). The fixed accounts are investment choices within our general account.

Purchase payments allocated to the fixed accounts and transfers to the fixed accounts become part of our general account which supports insurance and annuity obligations. The general account has not been registered under the Securities Act of 1933 (1933 Act) nor is the general account registered under the 1940 Act because of exemptive and exclusionary provisions. Accordingly, neither the general account nor any interests therein are generally subject to the provisions of the 1933 Act or the 1940 Act. Disclosures regarding the fixed accounts or the general account, however, are subject to certain generally applicable provisions of the federal securities laws relating to the accuracy and completeness of statements made in this prospectus. For more information about our general account see "Other Information – Our Ability to Make Payments Under the Contract."

DCA Fixed Accounts. Each DCA Fixed Account is a fixed account from which assets are systematically transferred to any fund(s). You may not transfer your certificate value in a DCA Fixed Account to The Fixed Account. During the accumulation phase, you may choose to have your purchase payments allocated to a DCA Fixed Account for the period of the DCA Fixed Account Term (DCA Term). Your election must be in writing.

Currently, you have a choice of two DCA Fixed Accounts:

- a) DCA Fixed Account with a DCA Term of six months; or
- b) DCA Fixed Account with a DCA Term of 12 months.

To the extent permitted by law, we reserve the right to change the duration of the DCA Terms in the future. Your DCA Term will terminate upon payment of the death benefit. You may only participate in one DCA Fixed Account at a time.

How to Participate in the DCA Fixed Account

To participate in the DCA Fixed Account you must apply a new purchase payment of \$5,000 or greater to a DCA Term or provide us with evidence satisfactory to us that you will apply \$5,000 or more to a DCA Term via transfer(s) from another financial institution. Purchase payments which originate from an annuity contract issued by us or any of our affiliates cannot be allocated to a DCA Fixed Account. We reserve the right to reject purchase payments. You cannot transfer current certificate values into the DCA Fixed Account. The first DCA transfer will occur five business days after we receive all or a portion of the purchase payment into the DCA Fixed Account.

Any portion of the sum to be applied to the DCA Fixed Account that we receive after the start of the DCA Term, will be added to the amount in the current DCA Term and will participate only in the remaining period of that DCA Term. You may apply additional purchase payments to the current DCA term. Those additional purchase payments will be added to the amount in the current DCA Term and will participate only in the remaining period of the current DCA Term.

We make scheduled monthly transfers from the DCA Fixed Account. The first transfer will occur five business days after we receive your payment allocated to the DCA Fixed Account and a completed DCA Fixed Account election form. You may not take partial withdrawals from the DCA Fixed Account.

You may make a one-time transfer of your remaining certificate value in the DCA Fixed Account into any of the fund(s), prior to the expiration of your DCA Term. Your transfer will be effective on the business day we receive, in good order, your written request or telephone request at our Service Center. Our business day closes when the NYSE closes, usually 4:00 p.m. Eastern Time. If we receive your transfer request in good order at our Service Center on a non-business day or after our business day closes, your transfer request will be effective on the next business day.

We reserve the right to assess a fee for processing transactions under the DCA Fixed Account.

If you elect to make an allocation to a DCA Fixed Account, but your annuity date will occur prior to the end of that DCA Term, your DCA Term will expire early. It will expire on your annuity date. We will transfer any certificate value remaining in the DCA Fixed Account on your annuity date in accordance with your DCA Fixed Account transfer instructions in effect at that time. No amounts will remain in the DCA Fixed Account after your annuity date.

We periodically set the interest rate we credit to the DCA Fixed Account. We will credit an interest rate at a rate not less than the minimum allowed by state law at the time we issue your certificate. We reserve the right to change the guaranteed minimum interest rate for newly issued certificates, subject to applicable state law. The interest rate you will receive for the entire DCA Term is the interest rate in effect on the date your DCA Term begins. We guarantee the interest rate for the full DCA Term.

The Fixed Account. You may allocate purchase payments to The Fixed Account. You can also make transfers of your certificate value into The Fixed Account. You do not participate in the investment performance of the assets in The Fixed Account. Instead, we credit your certificate with interest at a specified rate that we declare in advance. We will credit an interest rate at a rate not less than the minimum allowed by state law at the time we issue your certificate. We reserve the right to change the guaranteed minimum interest rate for newly issued certificates, subject to applicable state law.

Certificate Value

Your certificate value is the sum of your value in the sub-accounts and the fixed account(s).

Your value in the separate account will vary depending on the investment performance of the funds you choose. In order to keep track of your certificate value in the separate account, we use a unit of measure called an accumulation unit. During the income phase of your certificate we call the unit an annuity unit if a variable annuity option is elected.

Accumulation Units. Every business day we determine the value of an accumulation unit for each of the sub-accounts. Changes in the accumulation unit value reflect the investment performance of the fund as well as deductions for insurance and other charges.

The value of an accumulation unit may go up or down from business day to business day. The SAI contains more information on the calculation of the accumulation unit value.

When you make a purchase payment, we credit your certificate with accumulation units. We determine the number of accumulation units to credit by dividing the amount of the purchase payment allocated to a sub-account by the value of the accumulation unit for that sub-account. When you make a withdrawal, we deduct from your certificate accumulation units representing the withdrawal amount.

We calculate the value of an accumulation unit for each sub-account after the NYSE closes each business day. Any change in the accumulation unit value will be reflected in your certificate value.

Example:

On Monday we receive an additional purchase payment of \$5,000 from you. You have told us you want this to go to the MML Managed Bond sub-account. When the NYSE closes on that Monday, we determine that the value of an accumulation unit for the MML Managed Bond sub-account is \$13.90. We then divide \$5,000 by \$13.90 and credit your certificate on Monday night with 359.71 accumulation units for the MML Managed Bond sub-account.

Business Days and Non-Business Days

Our business day closes when the NYSE business day closes. The NYSE business day usually closes at 4:00 p.m. Eastern Time. Our non-business days are those days when the NYSE is not open for trading.

Sending Requests in Good Order

From time to time you may want to submit a request for transfer among investment choices, a withdrawal, a change of beneficiary, or some other action. We can only act upon your request if we receive it in “good order.” Contact our Service Center to learn what information we require for your request to be in “good order.” Generally, your request must include the information and/or documentation we need to complete the action without using our own discretion to carry it out. Additionally, some actions may require that you submit your request on our form. We may, in our sole discretion, determine whether any particular transaction request is in good order, and we reserve the right to change or waive any good order requirements at any time. To help protect against unauthorized or fraudulent telephone instructions, we will use reasonable procedures to confirm that telephone instructions given to us are genuine. We may record all telephone instructions.

In addition to written requests, we may allow requests to our Service Center:

- by fax at (866) 329-4272,
- by e-mail at ANNfax@MassMutual.com,
- by telephone at (800) 272-2216, or
- by internet at www.MassMutual.com/loginsc.

Fax, telephone, e-mail or internet transactions may not always be available. Fax, telephone and computer systems can experience outages or slowdowns for a variety of reasons. These outages or slowdowns may prevent or delay our receipt of your request. We may make these additional methods available at our discretion. They may be suspended or discontinued at any time without notice. Not all transaction types can be requested by fax, telephone or the internet.

Transfers and Transfer Programs

General Overview

We have the right to terminate, suspend, or modify the transfer and transfer program provisions described in this prospectus.

You can transfer all or part of your certificate value. You can make transfers by written request, e-mail, telephone, fax, or by other means we authorize. You must clearly indicate the amount and investment choices from and to which you wish to transfer.

Your registered representative may provide us with instructions on your behalf involving fund transfers subject to our rules and requirements, including the restrictions on frequent trading and market timing activities.

Your transfer is effective on the business day we receive your request in good order at our Service Center. Our business day closes when the NYSE closes, usually 4:00 p.m. Eastern Time. If we receive your transfer request in good order at our Service Center on a non-business day or after our business day closes, your transfer request will be effective on the next business day.

Transfers During the Accumulation Phase

References to “The Fixed Account” pertain only to The Fixed Account and not the DCA Fixed Accounts. For DCA Fixed Account transfer rules see “Investment Choices – The Fixed Accounts – DCA Fixed Accounts.”

You may transfer all or part of your assets in a fund or The Fixed Account. You can make a transfer to or from The Fixed Account and to or from any fund. During the accumulation phase we do not assess a transfer fee. However, we reserve the right to allow 12 free transfers per calendar year and charge for transfers in excess of 12. The charge equals \$20 per transfer or 2% of the amount that is transferred, whichever is less.

The following rules apply to any transfer during the accumulation phase:

- 1) Currently, the minimum amount which you can transfer is:
 - \$100; or
 - the entire value in a fund, if less.

We reserve the right to impose a minimum transfer requirement of \$1,000. Currently, we do not require that a minimum amount remain in the fund after a transfer. However, we reserve the right to require that \$1,000 remain in the fund after a transfer unless you transfer the entire fund value. We waive these requirements if the transfer is made in connection with the Automatic Rebalancing Program.

- 2) You must clearly indicate the amount and investment choices from and to which you wish to transfer.
- 3) During any certificate year, we limit transfers out of The Fixed Account to the greater of \$30,000 or 30% of your certificate value in The Fixed Account as of the end of the previous certificate year. However, if you transfer 30% of your certificate value in The Fixed Account for three consecutive certificate years, your transfer in the fourth consecutive certificate year may be for the entire amount in The Fixed Account, provided that you have not applied payments or transferred certificate value into The Fixed Account from the time the first annual transfer was made. We measure a certificate year from the anniversary of the day we issued your certificate. Transfers out of The Fixed Account are done on a first-in, first-out basis. In other words, amounts attributed to the oldest purchase payments are transferred first; then amounts attributed to the next oldest purchase payments are transferred; and so on.
- 4) We consider The Fixed Account and a money market fund to be “competing accounts.” Transfers between competing accounts are not allowed. For a period of 90 days following a transfer out of a competing account, no transfers may be made into the other competing account. In addition, for a period of 90 days following a transfer into a competing account, no transfers may be made out of the other competing account.

Limits on Frequent Trading and Market Timing Activity

The certificate and its investment choices are not designed to serve as vehicles for what we have determined to be frequent trading or market timing trading activity. We consider these activities to be abusive trading practices that can disrupt the management of a fund in the following ways:

- by requiring the fund to keep more of its assets liquid rather than investing them for long-term growth, resulting in lost investment opportunity; and
- by causing unplanned portfolio turnover.

These disruptions, in turn, can result in increased expenses and can have an adverse effect on fund performance that could impact all participants and beneficiaries under the certificate, including long-term participants who do not engage in these activities. Therefore, we discourage frequent trading and market timing trading activity and will not accommodate frequent transfers of certificate value among the funds. Organizations and individuals that intend to trade frequently and/or use market timing investment strategies should not purchase the certificate.

We have adopted policies and procedures to help us identify those individuals or entities that we determine may be engaging in frequent trading and/or market timing trading activities. We monitor trading activity to uniformly enforce those procedures. However, those who engage in such activities may employ a variety of techniques to avoid detection. Our ability to detect frequent trading or market timing may be limited by operational or technological systems, as well as by our ability to predict strategies employed by participants (or those acting on their behalf) to avoid detection. Therefore, despite our efforts to prevent frequent trading and the market timing of funds among the sub-accounts, there can be no assurance that we will be able to identify and curtail every instance of trading of those who trade frequently or those who employ a market timing strategy or those who act as intermediaries on behalf of such persons. Moreover, our ability to discourage and restrict frequent trading or market timing may be limited by decisions of state regulatory bodies and court orders that we cannot predict.

In addition, some of the funds are available with variable products issued by other insurance companies. We do not know the effectiveness of the policies and procedures used by these other insurance companies to detect frequent trading and/or market timing. As a result of these factors, the funds may reflect lower performance and higher expenses across all certificates as a result of undetected abusive trading practices.

If we, or the investment adviser to any of the funds available with the certificate, determine that a participant’s transfer patterns reflect frequent trading or employment of a market timing strategy, we will allow the participant to submit transfer requests

by regular mail only. We will not accept other participant transfer requests if submitted by overnight mail, fax, the telephone, our website, or any other type of electronic medium. Additionally, we may reject any single trade that we determine to be abusive or harmful to the fund. Orders for the purchase of fund shares may be subject to acceptance by the fund. Therefore, we reserve the right to reject, without prior notice, any fund transfer request if the investment in the fund is not accepted for any reason.

The funds may assess a redemption fee (which we reserve the right to collect) on shares held for a relatively short period. The prospectuses for the funds describe the funds' frequent trading and market timing policies and procedures, which may be more or less restrictive than the policies and procedures we have adopted. We have entered into a written agreement, as required by SEC regulation, with each fund or its principal underwriter that obligates us to provide to the fund promptly upon request certain information about the trading activity of individual participants, and to execute instructions from the fund to restrict or prohibit further purchases or transfers by specific participants who violate the frequent trading or market timing policies established by the fund.

Participants and other persons with interests in the certificates should be aware that the purchase and redemption orders received by the funds generally are "omnibus" orders from intermediaries, such as retirement plans or separate accounts funding variable insurance contracts. The omnibus orders reflect the aggregation and netting of multiple orders from individual owners of variable contracts and/or individual retirement plan participants. The omnibus nature of these orders may limit the funds in their ability to apply their frequent trading or market timing policies and procedures. It may also require that we restrict or prohibit further purchases or transfers as requested by a fund on all certificates owned by a participant whose trading activity under one variable certificate has violated a fund's frequent trading or market timing policy. If a fund believes that an omnibus order reflects one or more transfer requests from participants engaged in frequent trading or market timing activity, the fund may reject the entire omnibus order.

We will notify you in writing if we reject a transfer or if we implement a restriction due to frequent trading or the use of market timing investment strategies. If we do not accept a transfer request, no change will be made to your allocations per that request. We will then allow you to resubmit the rejected transfer by regular mail only.

Additionally, we may in the future take any of the following restrictive actions that are designed to prevent the employment of a frequent trading or market timing strategy:

- not accept transfer instructions from a participant or other person authorized to conduct a transfer;
- limit the number of transfer requests that can be made during a certificate year; and
- require the value transferred into a fund to remain in that fund for a particular period of time before it can be transferred out of the fund.

We will apply any restrictive action we take uniformly to all participants we believe are employing a frequent trading or market timing strategy. These restrictive actions may not work to deter frequent trading or market timing activity.

We reserve the right to revise our procedures for detecting frequent trading and/or market timing at any time without prior notice if we determine it is necessary to do so in order to better detect frequent trading and/or market timing, to comply with state or federal regulatory requirements, or to impose different restrictions on frequent traders and/or market timers. If we modify our procedures, we will apply the new procedure uniformly to all participants.

Transfers During the Income Phase

During the income phase, we allow six transfers each calendar year, and they are not subject to a transfer fee. You cannot transfer from the general account to a fund, but you can transfer from one or more funds to the general account once a certificate year. The minimum amount which you can transfer is \$1,000 or your entire interest in the fund, if less. After a transfer, the minimum amount which must remain in a fund is \$1,000 unless you have transferred the entire value.

Transfer Programs

For detailed rules and restrictions pertaining to these programs and instructions for electing a program contact our Service Center.

Overview. We currently offer the following transfer programs:

- 1) Dollar Cost Averaging Program;
- 2) Automatic Rebalancing Program; and
- 3) Interest Sweep Option.

These programs are only available during the accumulation phase of your certificate.

You may only participate in one of these programs at any one time.

You may not participate in these programs if you have a current election of a DCA Fixed Account.

We do not charge you for participation in these programs, though we reserve the right to charge for the programs in the future.

Dollar Cost Averaging Program. This program allows you to systematically transfer a set amount or percentage from a selected fund to any of the other funds. By allocating amounts on a regular schedule as opposed to allocating the total amount at one particular time, you may be less susceptible to the impact of market fluctuations. Dollar cost averaging does not assure a profit and does not protect you against loss in declining markets. Since dollar cost averaging involves continuous investment in securities regardless of fluctuating price levels of such securities, you should consider your financial ability to continue the program through periods of fluctuating price levels.

Your Dollar Cost Averaging Program will terminate:

- if you withdraw the total certificate value;
- upon payment of the death benefit;
- if the last transfer you selected has been made;
- if there is insufficient certificate value in the source fund to make the transfer; or
- if we receive from you, in good order, a written request or request over the telephone to terminate the program prior to the next scheduled transfer date.

Automatic Rebalancing Program. Over time, the performance of each fund may cause your allocation to shift from your original allocation. You can direct us to automatically rebalance your certificate value allocated to the funds in order to return to your original percentage allocations by selecting our Automatic Rebalancing Program. Certificate value allocated to the fixed accounts cannot participate in the Automatic Rebalancing Program.

This program will terminate:

- if you withdraw the total certificate value;
- upon payment of the death benefit;
- if we receive from you, in good order, a written request or a request over the telephone to terminate the program; or
- if we receive any unscheduled transfer request.

Interest Sweep Option. Under this program, we will automatically transfer earnings from your certificate value in The Fixed Account to any one fund or combination of funds that you select. By allocating these earnings to the funds, you can pursue further growth in the value of your certificate through more aggressive investments. However, the Interest Sweep Option does not assure a profit and does not protect against loss in declining markets.

This program will terminate:

- if, as the result of a withdrawal, you no longer have certificate value in The Fixed Account;
- if, at time of transfer, no interest is available for transfer (for example, if the interest earned is required to cover certificate related charges or has been part of a partial withdrawal);
- upon payment of the death benefit; or
- if we receive from you, in good order, a written request or request over the telephone to terminate the program prior to the next scheduled transfer date.

Withdrawals

Your ability to take a withdrawal may be restricted by certain provisions of the Internal Revenue Code. Furthermore, if your certificate is issued under a qualified plan, your ability to take a withdrawal may be restricted by your plan documents. Income taxes, tax penalties, a contingent deferred sales charge and certain restrictions may apply to any withdrawal you make.

During the accumulation phase you may make either partial or total withdrawals of your certificate value.

When a partial withdrawal is made from a certificate, we reflect the withdrawal as a reduction to the value of the certificate's death benefit. We describe this reduction in the "Death Benefit" section. If we reflect the reduction as a percentage of certificate value withdrawn, the benefit may be reduced by more than the actual dollar amount of the withdrawal. The reduction will be greater when the value of your certificate investment choices is lower due to market performance or other variables. If you withdraw your full certificate value, the certificate terminates and does not provide a death benefit.

Unless you instruct us otherwise, we will take any partial withdrawal proportionally from your certificate value in the funds and The Fixed Account. When making a partial withdrawal, you must withdraw at least \$100 or the entire value in a fund or The Fixed Account, if less. We require that after you make a partial withdrawal you keep at least \$5,000 in a non-qualified certificate. For qualified certificates, the amount is \$2,000, unless your partial withdrawal is a minimum required distribution. Partial withdrawals may be subject to a contingent deferred sales charge.

When you make a total withdrawal you will receive the value of your certificate:

- less any contingent deferred sales charge, if applicable;
- less any applicable premium tax;

- less any annual certificate maintenance charge, and
- less any purchase payments we credited to your certificate that have not cleared the bank, until they clear the bank.

We take withdrawals first from earnings and then from purchase payments. For purposes of the contingent deferred sales charge, we treat withdrawals as coming from the oldest purchase payments first.

Requests in Writing. To request a withdrawal in writing, submit in good order to our Service Center, our partial surrender or full surrender form. If your withdrawal involves an exchange or transfer of assets to another financial institution, we also require a “letter of acceptance” from the financial institution.

Requests by Other Means. You may request certain partial and full withdrawals by other means we authorize such as e-mail, telephone, or fax. Contact our Service Center for details.

Withdrawal Effective Date. For written requests, your withdrawal is effective on the business day we receive, in good order, at our Service Center:

- a) our partial surrender or full surrender form; and
- b) if applicable, a “letter of acceptance.”

If we receive this item(s) at our Service Center on a non-business day or after our business day closes, your withdrawal request will be effective on the next business day. For e-mail, telephone or fax requests, your withdrawal is effective on the business day we receive your request in good order, provided it is received prior to the close of business. For requests received after the close of the business day, your withdrawal will be effective on the next business day.

Delivery of Withdrawal Amount. We will pay any withdrawal amount within seven days of the withdrawal effective date, unless we are required to suspend or postpone withdrawal payments. See “Other Information – Suspension of Payments or Transfers.”

We will pay any full or partial withdrawal to the qualified plan trustee or plan administrator, if you purchased your certificate under a tax-qualified retirement plan, a non-qualified deferred compensation plan or a deferred compensation plan for a tax-exempt organization. The only exceptions are for required minimum distribution payments and for withdrawals from individually-owned qualified certificates or certificates owned under a governmental 457(b) deferred compensation plan.

Systematic Withdrawal Program. *For detailed rules and restrictions pertaining to this program and instructions for electing the program contact our Service Center.*

The Systematic Withdrawal Program (SWP) allows you to set up automatic periodic withdrawals from your certificate value. We do not charge you for participation in the SWP, but we reserve the right to charge in the future. We will take any withdrawal under this program proportionally from your certificate value in your selected investment choices.

Your SWP will end:

- if you withdraw your total certificate value;
- if the next systematic withdrawal will lower your certificate value below the minimum certificate value we allow following a partial withdrawal, unless your withdrawal is a minimum required distribution;
- if we receive, in good order, a notification of the participant’s death;
- if we receive, in good order, a notification of the annuitant’s death if the participant is a non-natural person;
- if your value in a selected fund or The Fixed Account is insufficient to complete the withdrawal;
- if we process the last withdrawal you selected;
- if you begin receiving annuity payments; or
- if we receive from you, in good order, a written request or request over the telephone to terminate the program any time before or on the next withdrawal date. If your certificate is a Beneficiary IRA, your SWP cannot be terminated.

Expenses

This section describes the charges and deductions we make under the certificate to compensate us for the services and benefits we provide, costs and expenses we incur and risks we assume. We may profit from the charges deducted and we may use any such profits for any purpose, including payment of distribution expenses. These charges and deductions reduce the return on your investment in the certificate. These charges and expenses are:

Insurance Charges

Each business day we deduct our insurance charges from the assets of the separate account. We do this as part of our calculation of the value of the accumulation units and the annuity units. The insurance charge has two parts:

- 1) the mortality and expense risk charge; and
- 2) the administrative charge.

Mortality and Expense Risk Charge

This charge is equal, on an annual basis, to 1.25% of the daily value of the assets invested in each fund, after fund expenses are deducted. This charge is for:

- the mortality risk associated with the insurance benefits provided, including our obligation to make annuity payments after the annuity date regardless of how long all annuitants live, the death benefits, and the guarantee of rates used to determine your annuity payments during the income phase; and
- the expense risk that the current charges will be insufficient to cover the actual cost of administering the certificate.

We cannot increase the mortality and expense risk charge. If the current mortality and expense risk charge is not sufficient to cover the mortality and expense risk, we will bear the loss. If the amount of the charge is more than sufficient to cover the mortality and expense risk, we will make a profit on the charge. We may use this profit for any purpose, including the payment of marketing and distribution expenses for the certificate.

Administrative Charge

This charge is equal, on an annual basis, to 0.15% of the daily value of the assets invested in each fund, after fund expenses are deducted. We assess this charge, together with the annual certificate maintenance charge, to reimburse us for all the expenses associated with the administration of the certificate and the separate account. Some of these expenses are: preparation of the certificate, confirmations, annual reports and statements, maintenance of certificate records, personnel costs, legal and accounting fees, filing fees, and computer and systems costs. We may increase this charge at any time while you own the certificate, but the charge will never exceed 0.25%. If we increase this charge, we will give you 90 days prior notice.

Annual Certificate Maintenance Charge

At the end of each certificate year, we deduct \$30 from your certificate as an annual certificate maintenance charge. We assess this charge, together with the administrative charge, to reimburse us for all the expenses associated with the administration of the certificate and the separate account. Some of these expenses are: preparation of the certificate, confirmations, annual reports and statements, maintenance of certificate records, personnel costs, legal and accounting fees, filing fees, and computer and systems costs. We may increase this charge at any time while you own the certificate, but the charge will never exceed \$60. If we increase this charge, we will give you 90 days prior notice. Currently, we will not deduct this charge if, when we are to make the deduction, the value of your certificate is \$50,000 or more. However, we reserve the right to increase the certificate value amount at which we will waive this charge to \$100,000 as provided by the certificate. Subject to state regulations, we will deduct the annual certificate maintenance charge proportionately from the investment choices you have selected. In no event, however, shall that portion of the annual certificate maintenance charge we deducted from the fixed accounts exceed \$30 during any certificate year.

If you make a total withdrawal from your certificate, and the certificate value is less than \$50,000, we will deduct the full annual certificate maintenance charge. If your certificate enters the income phase on a date other than its certificate anniversary and the certificate value is less than \$50,000, we will deduct a pro rata portion of the charge.

Contingent Deferred Sales Charge

We do not deduct a sales charge when we receive a purchase payment. However, we may assess a contingent deferred sales charge on any amount you withdraw that exceeds the free withdrawal amount. Additionally, we may assess a contingent deferred sales charge on amounts applied to Annuity Option E or F. We use this charge to cover certain expenses relating to the sale of the certificate.

If we assess a contingent deferred sales charge, we will deduct it from the amount that you withdraw or apply to Annuity Option E or F.

The amount of the charge depends on the amount of the purchase payments, the length of time since you made the purchase payments, and the amount of your withdrawal or, if applicable, the amount you apply to Annuity Option E or F. The contingent deferred sales charge is assessed as follows:

Year since Purchase Payment was Accepted	Charge
1st Year	7%
2nd Year	6%
3rd Year	5%
4th Year	4%
5th Year	3%
6th Year	2%
7th Year	1%
8th Year and thereafter	0%

After your purchase payment has been in the certificate for seven years, there is no charge when you withdraw the purchase payment. Each purchase payment has its own 7-year sales charge period. We take withdrawals first from earnings, and then from purchase payments. For purposes of the contingent deferred sales charge, we treat withdrawals as coming from the oldest purchase payments first.

In addition to the free withdrawals described later in this section, we will not impose a contingent deferred sales charge under the following circumstances.

- Upon payment of the death benefit.
- On amounts withdrawn as required minimum distributions (RMDs), to the extent they exceed the free withdrawal amount. In order to qualify for this exception, you must be participating in a systematic withdrawal program established for the payment of RMDs, under which the annual RMD is calculated by us, based solely on the fair market value of the certificate (RMD program). If you choose to take withdrawals to satisfy your RMD for the certificate outside of our RMD program, or if you choose to take withdrawals from the certificate to satisfy your RMD(s) for other qualified assets, contingent deferred sales charge may apply.
- Upon application of the certificate value to any Single Life or Joint and Survivor Life Annuity Option, or to a Period Certain Annuity of at least ten years.
- If you redeem excess contributions from a plan qualifying for special income tax treatment. These types of plans are referred to as qualified plans, including individual retirement annuities (IRAs). We look to the IRC for the definition and description of excess contributions.
- When the certificate is exchanged for another variable annuity contract issued by us or one of our affiliated insurance companies, of the type and class which we determine is eligible for such an exchange. A contingent deferred sales charge may apply to the certificate received in the exchange. A reduced contingent deferred sales charge schedule may apply under the certificate if another variable annuity contract issued by us or one of our affiliated insurance companies is exchanged for the certificate. Exchange programs may not be available in all states. We have the right to modify, suspend or terminate any exchange program any time without prior notification. If you want more information about our current exchange programs, contact your registered representative or us at our Service Center.
- If you apply your entire certificate value to purchase a single premium immediate life annuity or a fixed deferred annuity issued by us or one of our affiliates.
- On any withdrawals made or amounts applied to an Annuity Option when you reach the latest permitted annuity date for your certificate.

Free Withdrawals

You may withdraw, without incurring a contingent deferred sales charge, the greater of:

- the part of your certificate value that is attributable to positive investment results, if any, on the date of withdrawal; or
- 10% of purchase payments made to your certificate as of the date of withdrawal reduced by any free withdrawal(s) you previously took during the current certificate year.

We take withdrawals first from any positive investment results, if any, and then from purchase payments. If you withdraw an amount which exceeds your investment gain, we will reduce the amount of your remaining purchase payments. We will calculate the contingent deferred sales charge based on your oldest purchase payments first.

Premium Taxes

Some states and other governmental entities charge premium taxes or similar taxes. We are responsible for the payment of these taxes and will make a deduction from your certificate value for them, or we may adjust the annuity rates for premium tax assessed. Some of these taxes are due when your certificate is issued, others are due when annuity payments begin. Currently

we do not charge you for these taxes until you begin receiving annuity payments or you make a total withdrawal. We may discontinue this practice and assess the charge when the tax is due. Premium taxes generally range from 0% to 3.5%, depending on the state.

Transfer Fee

During the accumulation phase we do not assess a transfer fee. However, we reserve the right to allow 12 free transfers per calendar year and charge for transfers in excess of 12. The charge equals \$20 per transfer or 2% of the amount that is transferred, whichever is less.

During the income phase, we allow six transfers, and they are not subject to a transfer fee.

Income Taxes

We will deduct from the certificate any income taxes which we incur because of the operation of the separate account. At the present time, we are not making any such deductions. We will deduct any withholding taxes required by law.

Fund Expenses

The separate account purchases shares of the funds at net asset value. The net asset value of each fund reflects expenses already deducted from the assets of the fund. Such expenses include investment management fees and other expenses and may include acquired fund fees and expenses. For some funds, expenses may also include 12b-1 fees to cover distribution and/or certain service expenses. When you elect a fund as an investment choice, that fund's expenses will increase the cost of your investment in the certificate. See each fund's prospectus for more information regarding these expenses.

Annual Credit

For certificates issued on or after September 10, 2001.

Does not pertain to certificate value allocated to the fixed accounts.

If we issued you a certificate on or after September 10, 2001, we will increase your certificate value allocated to the funds by 0.15% on each certificate anniversary while your certificate is in effect. We will calculate this increase based on your certificate value allocated to the funds on your certificate anniversary. We will credit this increase proportionally to the funds you are invested in as of your certificate anniversary.

We pay this credit amount out of the revenues we receive for selling the certificates that are eligible for the credit. We provide this credit amount in lieu of reducing expenses directly. We will not subject this credit to the assessment of a contingent deferred sales charge upon withdrawal.

The Income Phase

Overview. If you want to receive regular income from your annuity, you can elect to apply your certificate value so that you can receive fixed and/or variable annuity payments under one of the annuity options described in this section. We may base annuity payments on the age and sex of the annuitant(s) under all options except Annuity Option E. We may require proof of age and sex before annuity payments begin.

If your certificate value is less than \$2,000 on the annuity date, we reserve the right to pay you a lump sum rather than a series of annuity payments. If any annuity payment is less than \$100, we reserve the right to change the payment basis to equivalent less frequent payments.

Annuity Payment Start Date. You can choose the day, month and year in which annuity payments begin. This date must be the 1st through 28th day of the month. We call that date the annuity date. According to your certificate, your annuity date cannot be earlier than five years after you buy the certificate. However, we currently allow you to select an annuity date that is at least 30 days after you purchase your certificate. You may choose your annuity date when you purchase your certificate. After you purchase your certificate you can request an earlier annuity date by notifying us in writing at least 30 days before the annuity date. You can request that we delay your annuity date by notifying us in writing or by telephone any time before or on the annuity date.

Annuity payments must begin by the earlier of:

- 1) the 90th birthday of the annuitant or oldest joint annuitant;
- 2) your 90th birthday if you are not the annuitant or the 90th birthday of the oldest joint participant; or
- 3) the latest date permitted under state law.

Upon written request we will defer the annuity date up to the 100th birthday.

Electing an Annuity Option. On the annuity date, we must have written instructions in good order at our Service Center regarding your annuity option choice including whether you want fixed and/or variable payments.

If on the annuity date we do not have your instructions, we will assume you elected Option B with ten years of payments guaranteed. We will use certificate value in the funds to provide a variable portion of each annuity payment and certificate value in The Fixed Account and the DCA Fixed Account, if any, to provide a fixed portion of each annuity payment. If your certificate is a qualified certificate, we may default you to a different annuity option in order to comply with requirements applicable to qualified plans.

Required Minimum Distributions for Tax-Qualified Certificates. In order to avoid adverse tax consequences, you should begin to take distributions from your certificate no later than the beginning date required by the IRC. These distributions can be withdrawals or annuity payments. The distributions should be at least equal to the minimum amount required by the IRC or paid through an annuity option that complies with the required minimum distribution rules of IRC Section 401(a)(9). If your certificate is an individual retirement annuity, the required beginning date is no later than April 1 of the calendar year after you reach age 70½. For qualified plans and tax-sheltered annuities, that date is no later than April 1 of the calendar year following the later of: the year you reach age 70½ or the year in which you retire. The option of deferring to retirement is not available if you are a 5% or greater owner of the employer sponsoring your qualified plan.

Fixed Annuity Payments. If you choose fixed payments, the payment amount will not vary. The payment amount will depend upon the following:

- the value of your certificate on the annuity date;
- the annuity option you elect;
- the age and sex of the annuitant or joint annuitants, if applicable;
- the minimum guaranteed payout rates associated with your certificate;
- the deduction of a contingent deferred sales charge (may be deducted under Annuity Options E and F only); and
- the deduction of premium taxes, if applicable.

If the single premium immediate annuity rates offered by MassMutual on the annuity date are more favorable than the minimum guaranteed rates listed in your certificate, those rates will be used.

Variable Annuity Payments. If you choose variable payments, the payment amount will vary with the investment performance of the funds you elect. The first payment amount will depend on the following:

- the value of your certificate on the annuity date;
- the annuity option you elect;
- the age and sex of the annuitant or joint annuitants, if applicable;
- the minimum guaranteed payout rates associated with your certificate;
- an assumed investment rate (AIR) of 4% per year;
- the deduction of a contingent deferred sales charge (may be deducted under Annuity Options E and F only); and
- the deduction of premium taxes, if applicable.

Future variable payments will depend on the performance of the funds you elected. If the actual performance on an annualized basis exceeds the 4% assumed investment rate plus the deductions for expenses, your annuity payments will increase. Similarly, if the actual rate is less than 4% annualized plus the amount of the deductions, your annuity payments will decrease.

Annuity Unit Values. In order to keep track of the value of your variable annuity payment, we use a unit of measure called an annuity unit. The value of your annuity units will fluctuate to reflect the investment performance of the funds you elected. We calculate the number of your annuity units at the beginning of the income phase. During the income phase, the number of annuity units will not change unless you make a transfer; make a withdrawal as permitted under certain annuity options; or you elect an annuity option with reduced payments to the survivor and those payments to the survivor commence. The SAI contains more information on how annuity payments and annuity unit values are calculated.

Annuity Options. The available annuity options are listed in this section in the Annuity Options table. We may consent to other plans of payment in addition to those listed. After annuity payments begin, you cannot change the annuity option, the frequency of annuity payments, or make withdrawals, except as described under Annuity Options E and F.

Limitations on Annuity Options. If you purchased the certificate as a tax-qualified certificate, the IRC may impose restrictions on which annuity option you may elect. Furthermore, if your certificate is issued under an ERISA plan, and you are married when your certificate enters the income phase, your ability to elect certain annuity options may be limited and/or require spousal consent.

Annuity Options

We may consent to other plans of payment in addition to those listed, including a Joint and Last Survivor Annuity with Period Certain.

Lifetime Contingent Options (variable and/or fixed payments)				
	<i>Annuity Option A Life Income</i>	<i>Annuity Option B Life Income with Period Certain</i>	<i>Annuity Option C Joint and Last Survivor Annuity</i>	<i>Annuity Option D Joint and 2/3 Survivor Annuity</i>
Number of Annuitants	One	One	Two	Two
Length of Payment Period	For as long as the annuitant lives.	For a guaranteed period of either 5, 10 or 20 years or as long as the annuitant lives, whichever is longer.	For as long as either annuitant lives.	For as long as either annuitant lives.
Annuity Payments After Death	None. All payments end upon the annuitant's death.	When the annuitant dies, if there are remaining guaranteed payments, the beneficiary may elect to continue receiving remaining guaranteed payments or the beneficiary may elect a lump sum payment equal to the commuted value of the remaining guaranteed annuity payments.	100% of the payment will continue during the lifetime of the surviving annuitant. No payments will continue after the death of both annuitants.	Payments will continue during the lifetime of the surviving annuitant and will be computed on the basis of two-thirds of the annuity payment (or units) in effect during the joint lifetime. No payments will continue after the death of both annuitants.

Non-Lifetime Contingent Options (variable and/or fixed payments)		
	<i>Annuity Option E Period Certain Annuity</i>	<i>Annuity Option F Special Income Settlement Agreement</i>
Number of Annuitants	One	Determined in accordance with terms agreed upon in writing by both you and us.
Length of Payment Period	For a specified period no less than five years and no greater than 30 years.	Determined in accordance with terms agreed upon in writing by both you and us.
Withdrawal Option/ Switch Annuity Option	If, after you begin receiving payments, you would like to receive all or part of the commuted value of the remaining guaranteed payments under this annuity option at any time, you may elect to receive it in a lump sum or have it applied to another annuity option. If you so elect, your future payments will be adjusted accordingly.	If we agree to pay you a variable annuity payment for a specified period of time under this annuity option, and after you begin receiving payments, you would like to receive all or part of the commuted value of the remaining guaranteed payments under this annuity option at any time, you may elect to receive it in a lump sum or have it applied to another annuity option. If you so elect, your future payments will be adjusted accordingly.

Non-Lifetime Contingent Options (variable and/or fixed payments) (continued)		
	<i>Annuity Option E</i> <i>Period Certain Annuity</i>	<i>Annuity Option F</i> <i>Special Income Settlement Agreement</i>
Contingent Deferred Sales Charge	In most states, we will deduct a contingent deferred sales charge if you apply your certificate value to this option and the period certain is less than ten years. If it is permitted in your state, but we do not deduct a contingent deferred sales charge at that time, we will deduct a contingent deferred sales charge if you subsequently request a commuted lump sum payment to yourself or a commuted value to apply to another annuity option. We will waive the contingent deferred sales charge if you commence annuity payments because you have reached the latest permissible annuity payment start date (see (1), (2) and (3) under “The Income Phase – Annuity Payment Start Date”).	
Annuity Payments After Death	When the annuitant dies, if there are remaining guaranteed payments, the beneficiary may elect to continue receiving remaining guaranteed payments or the beneficiary may elect a lump sum payment equal to the commuted value of the remaining guaranteed annuity payments. We will not deduct a contingent deferred sales charge.	

Death Benefit

Death of Participant During the Accumulation Phase. If you, or any joint participant, die during the accumulation phase, we will pay a death benefit to the primary beneficiary. If any joint participant dies, we will treat the surviving joint participant as the primary beneficiary and treat any other beneficiary designation, on record at the time of death, as a contingent beneficiary, unless both joint participants have submitted a written request to our Service Center, in good order, requesting otherwise.

Your beneficiary may request that the death benefit be paid under one of the death benefit options. If your certificate is a non-qualified certificate or is held as a traditional IRA (including SEP IRAs) or Roth IRA and the sole primary beneficiary is your surviving spouse, he or she may elect to become the participant of the certificate. See “Death Benefit – Death Benefit Payment Options During the Accumulation Phase.”

Death Benefit During the Accumulation Phase. The basic death benefit is the only death benefit available to participants who purchased their certificates prior to May 1, 2000. Subject to state availability, if you purchased your certificate on or after May 1, 2000, the ratchet death benefit was also available. However, if you were age 80 or over when we issued your certificate, the ratchet death benefit was not available.

You select one of the available death benefits when we issue your certificate. After we issue your certificate, you may not change your death benefit selection.

If you select the ratchet death benefit, you will pay an additional charge. We will automatically pay a death benefit under the basic death benefit unless you have selected the ratchet death benefit.

Adjusted for Any Withdrawals or Less Any Withdrawals. In this prospectus we describe the formulas we use to determine death benefit amounts. In some formulas we use the language “adjusted for any withdrawals” and in other formulas we use the language “less any withdrawals.” These phrases have different meanings.

Adjusted for Any Withdrawals

If you take a withdrawal, we adjust your death benefit by using the percentage of certificate value withdrawn to lower the death benefit by the same percentage. We use the phrase “adjusted for any withdrawals” to describe this treatment of withdrawals within our formulas. Because this adjustment uses the percent of certificate value withdrawn, the death benefit may be reduced by more than the actual dollar amount of the withdrawal. The reduction will be greater when the value of your certificate investment choices is lower due to market performance or other variables.

Less Any Withdrawals

If you take a withdrawal, we lower your death benefit by subtracting the dollar amount of the withdrawal. We use the phrase “less any withdrawals” to describe this treatment of withdrawals within our formulas.

References to Age. Age is as of the nearest birthday. For example, age 80 is generally the period of time between age 79 years, 6 months and 1 day and age 80 and 6 months. See “Age.”

Basic Death Benefit. The death benefit paid will be the amount calculated (and adjusted for any applicable charges) as of the business day we receive proof of death and election of the payment method in good order at our Service Center. From the

time the death benefit is determined until complete distribution is made, any amount in a sub-account will be subject to investment risk. As a result, the death benefit amount may increase or decrease over time. The risk is borne by the beneficiary(ies).

The basic death benefit before you or the oldest joint participant reaches age 75 will be the greater of:

- 1) your certificate value; or
- 2) your purchase payments, less any withdrawals and any applicable charges; or
- 3) your certificate value on the most recent three year certificate anniversary, plus any subsequent purchase payments, less any subsequent withdrawals including any applicable charges. Your first certificate anniversary is one calendar year from the date we issued your certificate.

For certificates issued on or after October 1, 2003, subject to state approval and implementation, the word “less” is replaced with the words “adjusted for.” See “Death Benefit – Adjusted for Any Withdrawals or Less Any Withdrawals.”

After you or the oldest joint participant reaches age 75, the death benefit during the accumulation period will be the greater of:

- 1) your certificate value; or
- 2) your purchase payments, less any withdrawals and any applicable charges; or
- 3) your certificate value on the most recent three year certificate anniversary prior to the participant or the oldest joint participant reaching age 75, plus any subsequent purchase payments, less any subsequent withdrawals, including any applicable charges. Your first certificate anniversary is one calendar year from the date we issued your certificate.

For certificates issued on or after October 1, 2003, subject to state approval and implementation, the word “less” is replaced with the words “adjusted for.” See “Death Benefit – Adjusted for Any Withdrawals or Less Any Withdrawals.”

If the certificate is owned by a non-natural person, participant means annuitant for purposes of determining the death benefit amount.

Ratchet Death Benefit. The death benefit paid will be the amount calculated (and adjusted for any applicable charges) as of the business day we receive proof of death and election of the payment method in good order at our Service Center. From the time the death benefit is determined until complete distribution is made, any amount in a sub-account will be subject to investment risk. As a result, the death benefit amount may increase or decrease over time. The risk is borne by the beneficiary(ies).

If you choose the ratchet death benefit, the death benefit will be the greater of:

- 1) your certificate value; or
- 2) the annual ratchet death benefit amount.

We calculate the annual ratchet death benefit amount as follows:

When we issue your certificate, the annual ratchet death benefit is equal to your initial purchase payment. Thereafter, and prior to the date you, or the oldest joint participant or the annuitant if the certificate is purchased by a non-natural entity reaches age 80, we will calculate the ratchet death benefit:

- when you make a purchase payment;
- when you make a partial withdrawal; and
- on your certificate anniversary.

You will increase your ratchet death benefit if you make a purchase payment. If you make a subsequent purchase payment, the annual ratchet death benefit is equal to the most recently calculated annual ratchet death benefit plus the additional purchase payment.

You will decrease your ratchet death benefit if you make a partial withdrawal. If you make a withdrawal, the annual ratchet death benefit is equal to the most recently calculated annual ratchet death benefit, minus an adjustment for the withdrawal. We calculate the adjustment for the withdrawal as follows:

- a) divide the amount withdrawn by the most recent certificate value, and
- b) multiply it by the most recent annual ratchet death benefit.

On your certificate anniversary, the annual ratchet death benefit is equal to the greater of your certificate value or the most recently calculated annual ratchet death benefit.

If you do not make any additional purchase payments or any withdrawals, the annual ratchet death benefit will be the greater of all certificate anniversary certificate values on or prior to the date we calculate the death benefit.

When you, or the oldest joint participant, or the annuitant if the certificate is purchased by a non-natural entity, reaches age 80, the death benefit is the greater of:

- 1) your certificate value; or
- 2) the annual ratchet death benefit amount calculated on the certificate anniversary just prior to age 80, and adjusted for subsequent purchase payments and/or partial withdrawals in the same manner as described above.

We will deduct a quarterly charge for the ratchet death benefit from your certificate value. This charge is currently 0.15% on an annual basis of the daily value of your certificate value allocated to the funds and the fixed accounts, unless that charge exceeds the maximum charge, in which case the charge is the maximum charge. We will deduct this charge proportionately from the funds and the fixed accounts you have selected. We may increase this charge at any time while you own the certificate, but the charge will never exceed the maximum charge. The maximum charge is a percentage on an annual basis of the daily value of your certificate value allocated to the funds. The percentage is based on your age when the certificate was issued: 0.35% age 60 or younger; 0.50% age 61 through age 70; or 0.70% age 71 or older.

Death Benefit Payment Options During the Accumulation Phase. The availability of certain death benefit options may be limited for tax-qualified certificates in order to comply with the required minimum distribution rules.

A beneficiary must elect to receive the death benefit under one of the following options, in the event you die during the accumulation phase.

- **Option 1** – lump sum payment of the death benefit within five years of the date of death; or
- **Option 2** – payment of the death benefit under an annuity option over the lifetime of the beneficiary or over a period not extending beyond the life expectancy of the beneficiary with distribution beginning within one year of the date of your death or the death of any joint participant.

Additional Option for a Spouse Who is the Sole Primary Beneficiary

A surviving spouse who is the sole primary beneficiary under a certificate that is either non-qualified or is held as a traditional IRA (including SEP IRAs) or Roth IRA may elect option 1, option 2, or may elect to continue the certificate. Generally, if the certificate is continued then:

- 1) the initial value will equal the death benefit amount payable;
- 2) all applicable certificate features and benefits will be in the surviving spouse's name; and
- 3) the surviving spouse will exercise all of the participant's rights under the certificate.

Exceptions are as follows:

- a) if at the time the participant purchased the certificate the surviving spouse was over the maximum certificate issue age then the certificate cannot be continued;
- b) if at the time the participant purchased the certificate the surviving spouse was over the maximum allowable age for electing a certain feature then the feature is not available for continuance, but the certificate may be continued.

If the sole primary beneficiary is a domestic partner or civil union partner, as defined under applicable state laws, we will treat him or her as a spouse for this provision, and he or she may elect to continue the certificate as described herein. However, a domestic partner or civil union partner cannot elect to continue the certificate if it is a traditional IRA or Roth IRA. Since current federal tax law does not define a spouse to include a domestic partner or civil union partner, such domestic partner or civil union partner who elects to continue the certificate must still meet the distribution requirements of IRC Section 72(s). In order to meet these requirements, the amount of any gain in the certificate will become subject to income tax at the time the election to continue the certificate is made.

The right to continue the certificate by a surviving spouse, a domestic partner, or a civil union partner can only be exercised once while the certificate is in effect.

See "Taxes – Civil Unions and Domestic Partnerships" if you are in a domestic partnership or civil union.

Lump Sum Payment. If a lump sum payment is requested, we will pay the amount within seven calendar days after we receive proof of death and election of the payment method in good order at our Service Center, unless we are required to suspend or delay payment.

Benefit Management Account. For lump sum payments of at least \$10,000, your beneficiary may elect to receive the death benefit by establishing an interest-bearing draft account called the Benefit Management Account (BMA). We periodically set the interest rate we credit to the BMA. That rate will not be less than the minimum guaranteed interest rate provided under the BMA. We will send a draftbook to the beneficiary who will have access to all the monies in the account, including interest, by writing a draft for all or part of the proceeds. Our drafts are similar to checks. The minimum draft amount is \$250. If the account balance falls below \$1,000, the BMA will be closed automatically and a check for the remaining balance, including interest, will be sent to the beneficiary. The beneficiary may close the BMA at any time. No deposits may be paid into the BMA. The BMA is part of our general account and is subject to the claims of our creditors. The BMA is not a bank account or bank deposit and is not insured by the Federal Deposit Insurance Corporation. We may make a profit on amounts left in the BMA. If the contract has been assigned, the BMA is not available for the assignee's portion of the death benefit. The BMA may not be available in all states. We reserve the right to make changes in the terms and conditions of the BMA. Election of the BMA shall be treated as an election of a lump sum for tax reporting purposes under IRC Section 72(s) or 401(a)(9). Any interest paid on amounts in the BMA is taxable as ordinary income in the year such interest is credited.

Beneficiary IRA Election. Beneficiary, Inherited, Legacy or "Stretch" IRAs are all terms used to describe an IRA that is used exclusively to distribute death proceeds of an IRA or other qualified investment to the beneficiary over that beneficiary's life

expectancy in order to meet the required minimum distribution (RMD) rules. Upon the contract owner's death under an IRA or other qualified contract, a beneficiary(ies) may generally establish a Beneficiary IRA by either purchasing a new annuity contract or in some circumstances, by electing the Beneficiary IRA payout option under the current contract. Until withdrawn, amounts in a Beneficiary IRA or other qualified contract continue to be tax deferred. Amounts withdrawn each year, including amounts that are required to be withdrawn under the RMD rules, are subject to tax.

Eligibility Requirements/Restrictions:

If a beneficiary(ies) elects to establish a Beneficiary IRA after the death of the contract owner, the following rules apply:

- Any withdrawals under a new Beneficiary IRA contract in excess of the RMD may be subject to a contingent deferred sales charge as indicated by the terms of the contract purchased.
- For existing annuity contracts with single beneficiaries issued by us or one of our affiliates, the beneficiary will have the option of electing a Beneficiary IRA payout option under the current contract or establishing a Beneficiary IRA by purchasing a new annuity contract issued by us or one of our affiliates. Should the beneficiary decide to elect the Beneficiary IRA payout option under the current contract, any withdrawals in excess of the RMD will not be subject to a contingent deferred sales charge.
- For existing annuity contracts with multiple beneficiaries issued by us or one of our affiliates, a beneficiary wishing to establish a Beneficiary IRA funded by an annuity contract issued by us or one of our affiliates must purchase a new annuity contract.
- The source of funds to be invested must be from a traditional IRA, SEP IRA, SIMPLE IRA, Beneficiary IRA, TSA, 401(a) or a Qualified Employee Plan (includes Pension Plan, Money Purchase Pension Plan, Profit Sharing Plan, Keogh (HR10), Target Benefit Plan).
- Joint ownership of a Beneficiary IRA is not allowed.
- The annuity contract will be titled in the beneficiary's name as beneficiary for the deceased contract owner. The beneficiary must be the annuitant and the annuitant cannot be changed.
- For non-spousal Beneficiary IRAs, RMDs must begin by December 31st of the year following the year of the date of the contract owner's death. For spousal Beneficiary IRAs, RMDs may be deferred until the year the original owner would have attained age 70½. The RMD amount will generally be calculated based on the beneficiary's life expectancy and will be withdrawn on a proportional basis from all investment accounts in which funds are invested. If the original contract owner died after attaining age 70½ and was younger than the beneficiary, the RMD amount may be calculated based on the original contract owner's life expectancy in the year of his or her death. If there is a Beneficiary IRA previously established with another carrier and an RMD is required in the current calendar year, we will process the RMD. If however, an RMD is not required in the current calendar year, an RMD will not be processed until the year it is required.
- The contract value at time of issue will be equal to either the death benefit that would have been payable to the beneficiary if a lump sum distribution had been elected, or the contract value of an existing Beneficiary IRA that is being transferred to a new MassMutual annuity.
- Additional contributions cannot be applied to the Beneficiary IRA.
- Upon the death of the annuitant of the Beneficiary IRA, a death benefit, under the terms of the contract, will be paid to the succeeding beneficiary in a lump sum or over the annuitant's remaining life expectancy as determined by the applicable IRS table.
- If the beneficiary is a trust, a Beneficiary IRA may only be established if the trust qualifies as a "see-through" trust. For see-through trusts, required minimum distributions must be calculated based upon the life expectancy of the oldest trust beneficiary and the oldest trust beneficiary must be the annuitant. In order to be a see-through trust, the trust must be valid under state law and be irrevocable, and all beneficiaries, current and future, must be identifiable from the trust instrument. If any beneficiary of the trust is not an individual, the trust is not a see-through trust and cannot establish a Beneficiary IRA.
- Additional rules may apply. Please consult your registered representative for further information.
- We have the right to modify, suspend or terminate the Beneficiary IRA program at any time without prior notification.
- A Beneficiary IRA may only be established by the beneficiary of the IRA owner/qualified plan participant whose death triggered the RMD requirements of IRC Section 401(a)(9). A Beneficiary IRA may not be established as a "second generation" Beneficiary IRA by a successor beneficiary.

Beneficiaries should consult a qualified tax adviser for advice prior to establishing a Beneficiary IRA.

Death of Participant During the Income Phase. If you or the joint participant dies during the income phase, but the annuitant is still alive, we will pay the remaining payments under the annuity option elected at least as rapidly as under the method of distribution in effect at the time of your death.

If you, or any joint participant, die during the income phase, the primary beneficiary will become the participant. If any joint participant dies, we will treat the surviving joint participant as the primary beneficiary and treat any other beneficiary designation, on record at the time of death, as a contingent beneficiary, unless both joint participants have submitted a written request to our Service Center, in good order, requesting otherwise.

Death of Annuitant. If the annuitant, who is not the participant or joint participant, dies during the accumulation phase, you can name a new annuitant subject to our approval. If you do not name an annuitant within 30 days of the death of the annuitant, you will become the annuitant. However, if the participant is a non-natural person we will treat the death of the annuitant as the death of the participant, and you may not name a new annuitant.

Upon the death of the annuitant on or after the annuity date, the death benefit, if any, is as specified in the annuity option elected. We will pay death benefits at least as rapidly as under the method of distribution in effect at the annuitant's death.

Taxes

This prospectus describes your certificate, which is a contract between you, the participant, and MassMutual. In this tax discussion, we use the word "contract" to mean "certificate" and "owner" to mean "participant."

The information in this prospectus is general and is not an exhaustive discussion of all tax questions that might arise under the contract. The information is not written or intended as tax or legal advice. You should consult a tax adviser about your own circumstances. In addition, we do not profess to know the likelihood that current federal income tax laws and Treasury Regulations or the current interpretations of the Internal Revenue Code, Regulations, and other guidance will continue. We cannot make any guarantee regarding the future tax treatment of any contract. We reserve the right to make changes in the contract to assure that it continues to qualify as an annuity for tax purposes.

No attempt is made in this prospectus to consider any applicable state or other tax laws.

Taxation of the Company. MassMutual is taxed as a life insurance company under the Internal Revenue Code of 1986, as amended (IRC). For federal income tax purposes, the separate account is not a separate entity from MassMutual, and its operations form a part of MassMutual.

Investment income and any realized gains on separate account assets generally are reflected in the certificate value, although treated as accruing to the Company and not to you. As a result, no taxes are due currently on interest, dividends and short or long-term gains earned by the separate account with respect to your certificate. The Company may be entitled to certain tax benefits related to the investment of Company assets, including assets of the separate account. These tax benefits, which may include foreign tax credits and the corporate dividends received deduction, are not passed back to you since the Company is the owner of the assets from which the tax benefits are derived.

Annuities in General. Annuity contracts are a means of both setting aside money for future needs — usually retirement — and for providing a mechanism to administer the payout of those funds. Congress recognized how important providing for retirement was and created special rules in the IRC for annuities. Simply stated, these rules provide that you will generally not be taxed on the earnings on the money held in your annuity contract until you take the money out. This is referred to as tax deferral.

Diversification. IRC Section 817(h) imposes certain diversification standards on the underlying assets of variable annuity contracts. The IRC provides that a variable annuity contract will not be treated as an annuity contract for any period (and any subsequent period) for which the investments are not, in accordance with regulations prescribed by the United States Treasury Department, adequately diversified. Disqualification of the contract as an annuity contract would result in a loss of tax deferral, meaning the imposition of federal income tax to the owner with respect to earnings under the contract prior to the receipt of payments under the contract. We intend that all investment portfolios underlying the contracts will be managed in such a manner as to comply with these diversification requirements.

Investor Control of Assets. For variable annuity contracts, tax deferral also depends on the insurance company, and not you, having control of the assets held in the separate accounts. You can transfer among the sub-accounts but cannot direct the investments each underlying fund makes. If you have too much investor control of the assets supporting the separate account funds, then you will be taxed on the gain in the contract as it is earned rather than when it is withdrawn. The IRS has provided some guidance on investor control by issuing Revenue Rulings 2003-91 and 2003-92, but some issues remain unclear. One unanswered question is whether an owner will be deemed to own the assets in the contract if a variable contract offers too large a choice of funds in which to invest, and if so, what that number might be. We do not know if the IRS will issue any further guidance on this question. We do not know if any guidance would have a retroactive effect. Consequently, we reserve the right to modify the contract, as necessary, so that you will not be treated as having investor control of the assets held under the separate account.

Non-Qualified Contracts. Your contract is referred to as a non-qualified contract if you do not purchase the contract under a qualified plan such as an Individual Retirement Annuity (IRA), Roth IRA, tax-sheltered annuity plan (TSA or TSA plan), corporate pension and profit-sharing plan (including 401(k) plans and H.R. 10 plans), or a governmental 457(b) deferred compensation plan.

Qualified Contracts. Your contract is referred to as a qualified contract if it is purchased under a qualified retirement plan (qualified plan) such as an Individual Retirement Annuity (IRA), Roth IRA, tax-sheltered annuity plan (TSA or TSA plan),

corporate pension and profit-sharing plan (including 401(k) plans and H.R. 10 plans), or a governmental 457(b) deferred compensation plan. Qualified plans are subject to various limitations on eligibility, contributions, transferability and distributions based on the type of plan. The tax rules regarding qualified plans are very complex and will have differing applications depending on individual facts and circumstances. You should consult a tax adviser as to the tax treatment and suitability of such an investment.

Taxation of participants in each qualified plan varies with the type of plan and terms and conditions of each specific plan. Owners, annuitants and beneficiaries are cautioned that benefits under a qualified plan may be subject to the terms and conditions of the plan regardless of the terms and conditions of the contracts issued pursuant to the plan. Some retirement plans are subject to distribution and other requirements that are not incorporated into our administrative procedures. Owners, participants and beneficiaries are responsible for determining that contributions, distributions and other transactions with respect to the contracts comply with applicable law.

Contracts issued under a qualified plan include special provisions restricting contract provisions that may otherwise be available as described in this prospectus. Generally, contracts issued under a qualified plan are not transferable. Various penalty and excise taxes may apply to contributions or distributions made in violation of applicable limitations. Furthermore, certain withdrawal penalties and restrictions may apply to distributions from qualified contracts. See “Taxes – Taxation of Qualified Contracts.”

Eligible rollover distributions from an IRA, TSA, qualified plan or governmental 457(b) deferred compensation plan may generally be rolled over into another IRA, TSA, qualified plan or governmental 457(b) deferred compensation plan, if permitted by the plan. These amounts may be transferred directly from one qualified plan or account to another, or as an indirect rollover, in which the plan participant receives a distribution from the qualified plan or account, and reinvests it in the receiving qualified plan or account within 60 days of receiving the distribution.

IRC Section 408(d)(3)(B) provides that an individual is only permitted to make one indirect rollover from an IRA to another IRA in any one year period. The IRS previously applied this limitation on an IRA-by-IRA basis, allowing a taxpayer to make an indirect rollover from an IRA, so long as he or she had not made an indirect rollover from that same IRA within the preceding one year period, even if he or she had made indirect rollovers from a different IRA. Effective for distributions on or after January 1, 2015, the limitation applies on an aggregate basis, meaning that an individual cannot make an indirect rollover from one IRA to another if he or she has made an indirect rollover involving any IRA (including a Roth, SEP, or SIMPLE IRA) within one year. It is important to note that the one rollover per year limitation does not apply to amounts transferred directly between IRAs in a trustee-to-trustee transfer.

On July 6, 1983, the Supreme Court decided in *Arizona Governing Committee v. Norris* that optional annuity benefits provided under an employer’s deferred compensation plan could not, under Title VII of the Civil Rights Act of 1964, vary between men and women. The contracts we sell in connection with qualified plans use annuity tables which do not differentiate on the basis of sex. Such annuity tables are also available for use in connection with certain non-qualified deferred compensation plans.

Following are general descriptions of the types of qualified plans with which the contracts may be used. Such descriptions are not exhaustive and are for general informational purposes only. The tax rules regarding qualified plans are very complex and will have differing applications depending on individual facts and circumstances. You should consult a tax adviser as to the tax treatment and suitability of your investment. The contribution limits referenced in the plan descriptions below are the limits for 2019, and may change in subsequent years.

Individual Retirement Annuities

IRC Section 408(b) permits eligible individuals to contribute to an individual retirement program known as an Individual Retirement Annuity (IRA). IRAs are subject to limitations on eligibility, contributions, transferability and distributions. See “Taxes – Taxation of Qualified Contracts.” IRA contributions are limited to the lesser of \$6,000 or 100% of compensation, and an additional catch-up contribution of \$1,000 is available for individuals age 50 and over. Contributions are deductible, unless you are an active participant in a qualified plan and your modified adjusted gross income exceeds certain limits. Contracts issued for use with IRAs are subject to special requirements by the IRC, including the requirement that certain informational disclosure be given to persons desiring to establish an IRA. You should consult a tax adviser as to the tax treatment and suitability of such an investment.

SEP IRAs

IRC Section 408(k) permits certain employers to establish IRAs for employees that qualify as Simplified Employee Pension (SEP) IRAs. Contributions to the plan for the benefit of employees will not be includible in the gross income of the employees until distributed from the plan. SEP IRAs are treated as defined contribution plans for purposes of the limits on employer contributions. Employer contributions cannot exceed the lesser of:

- i) \$56,000; or
- ii) 25% of compensation (a maximum of \$280,000 of compensation may be considered).

The employee may treat the SEP account as a traditional IRA and make deductible and non-deductible contributions if the general IRA requirements are met. SEP IRAs are subject to additional restrictions, including on items such as: the form, manner

and timing of distributions; transferability of benefits; vesting and nonforfeitability of interests; nondiscrimination in eligibility and participation; and the tax treatment of distributions, withdrawals and surrenders. See “Taxes – Taxation of Qualified Contracts.” You should consult a tax adviser as to the tax treatment and suitability of such an investment.

Roth IRAs

IRC Section 408A permits eligible individuals to contribute to a non-deductible IRA, known as a Roth IRA. Roth IRAs are subject to limitations on eligibility, contributions, transferability and distributions. Roth IRA contributions are limited to the lesser of \$6,000 or 100% of compensation, and an additional catch-up contribution of \$1,000 is available for individuals age 50 or over. The maximums are decreased by any contributions made to a traditional IRA for the same tax year. Lower maximum Roth IRA contribution limits apply to individuals whose modified adjusted gross income exceeds certain limits. Amounts may be rolled over from one Roth IRA to another Roth IRA. Furthermore, an individual may make a rollover contribution from a non-Roth IRA to a Roth IRA, known as a conversion. The individual must pay tax on any portion of the IRA being rolled over that represents income or previously deductible IRA contributions. The determination of taxable income is based on the fair market value of the IRA at the time of the conversion. See “Taxes – Required Minimum Distributions for Qualified Contracts” for information on the determination of the fair market value of an annuity contract that provides additional benefits (such as certain living or death benefits). You should consult a tax adviser as to the tax treatment and suitability of such an investment.

Corporate Pension and Profit-Sharing Plans

IRC Sections 401(a) and 401(k) permit employers to establish various types of retirement plans for employees. Contributions made to the plan for the benefit of the employees and the earnings on those contributions are generally not included in gross income of the employees until distributed from the plan. The tax consequences to participants may vary depending upon the particular plan design. In general, annual contributions made by an employer and employee to a defined contribution plan may not exceed the lesser of:

- i) \$56,000; or
- ii) 100% of compensation or earned income (a maximum of \$280,000 of compensation may be considered).

An employee’s elective salary reduction contributions under a cash or deferred arrangement (i.e. a 401(k) plan) are limited to \$19,000, with an additional catch-up contribution of up to \$6,000 available for eligible participants age 50 or over. Defined benefit plans are limited to contributions necessary to fund a promised level of benefit. The annual benefit under a defined benefit plan is limited to:

- i) 100% of compensation for a participant’s highest three years; or
- ii) \$225,000.

Plans are subject to additional restrictions, including on such items as: the form, manner and timing of distributions; transferability of benefits; vesting and nonforfeitability of interests; nondiscrimination in eligibility and participation; and the tax treatment of distributions, withdrawals and surrenders. See “Taxes – Taxation of Qualified Contracts.” You should consult a tax adviser as to the tax treatment and suitability of such an investment.

H.R. 10 Plans

IRC Section 401(a) permits self-employed individuals to establish qualified plans for themselves and their employees, commonly referred to as “H.R.10” or “Keogh” plans. Contributions made to the plan for the benefit of the employees and the earnings on those contributions are generally not included in gross income of the employees until distributed from the plan. The tax consequences to participants may vary depending upon the particular plan design. In general, H.R. 10 Plans are subject to the same restrictions as corporate pension and profit-sharing plans (see “Taxes – Qualified Contracts – Corporate Pension and Profit-Sharing Plans”), including limitations on eligibility, participation, contributions, time and manner of distributions, transferability and taxation of distributions. See “Taxes – Taxation of Qualified Contracts.” You should consult a tax adviser as to the tax treatment and suitability of such an investment.

Tax-Sheltered Annuities

IRC Section 403(b) permits certain eligible employers to purchase annuity contracts, known as Tax-Sheltered Annuities (TSAs), under a section 403(b) program. Eligible employers are organizations that are exempt from tax under IRC Section 501(c)(3) and public educational organizations. Contributions made to a TSA and the earnings on those contributions are generally not included in gross income of the employee until distributed from the plan. TSAs are subject to limitations on contributions, which may be made as “elective deferrals” (contributions made pursuant to a salary reduction agreement) or as non-elective or matching contributions by an employer. In general, annual contributions made by an employer and employee to a TSA may not exceed the lesser of:

- i) \$56,000; or
- ii) 100% of includible compensation (a maximum of \$280,000 of includible compensation may be considered).

An employee’s elective salary reduction contributions are limited to \$19,000. In addition, certain catch-up contributions may be made by eligible participants age 50 or over and those with 15 or more years of service with the same employer. TSAs are

subject to additional restrictions, including on such items as: the form, manner and timing of distributions; transferability of benefits; vesting and nonforfeitability of interests; nondiscrimination in eligibility and participation; and the tax treatment of distributions, withdrawals and surrenders. See “Taxes – Tax-Sheltered Annuities Taxation and Withdrawal Restrictions.” You should consult a tax adviser as to the tax treatment and suitability of such an investment.

Governmental 457(b) Deferred Compensation Plans

Employees of (and independent contractors who perform services for) certain state and local governmental units, or certain tax-exempt employers, may participate in an IRC Section 457(b) plan of the employer, allowing them to defer part of their salary or other compensation. Contributions made to an IRC Section 457(b) plan and the earnings on those contributions are generally not included in gross income of the employee until distributed from the plan. IRC Section 457(b) deferrals are limited to the lesser of:

- i) \$19,000; or
- ii) 100% of includible compensation.

In addition, certain catch-up contributions may be made by eligible participants age 50 or over, and those within three years of normal retirement age under the plan. The contract purchased is issued to the employer or trustee, as applicable. All contract value in a governmental 457(b) deferred compensation plan must be held for the exclusive benefit of the employee, and such plans are subject to limitations on distributions. See “Taxes – Withdrawal Restrictions – Governmental 457(b) Deferred Compensation Contract.” You should consult a tax adviser as to the tax treatment and suitability of such an investment.

Taxation of Non-Qualified Contracts. You, as the owner of a non-qualified annuity, will generally not be taxed on any increases in the value of your contract until a distribution occurs. There are different rules as to how you are taxed depending on whether the distribution is a withdrawal or an annuity payment.

Withdrawals

The IRC generally treats any withdrawal as first coming from earnings and then from your investment in the contract, if the withdrawal is:

- 1) allocable to investment in the contract made after August 13, 1982 in an annuity contract entered into prior to August 14, 1982; or
- 2) from an annuity contract entered into after August 13, 1982.

The withdrawn earnings are subject to tax as ordinary income.

Annuity Payments

Annuity payments occur as the result of the contract reaching its annuity start date. A portion of each annuity payment is treated as a partial return of your investment in the contract and is not taxed. The remaining portion of the annuity payment is treated as ordinary income. The annuity payment is divided between these taxable and non-taxable portions based on the calculation of an exclusion amount. The exclusion amount for annuity payments based on a fixed annuity option is determined by multiplying the payment by the ratio that the cost basis of the contract (adjusted for any period certain or refund feature) bears to the expected return under the contract. The exclusion amount for annuity payments based on a variable annuity option is determined by dividing the cost basis of the contract (adjusted for any period certain or refund guarantee) by the number of years over which the annuity is expected to be paid. Annuity payments received after you have recovered all of your investment in the contract are fully taxable.

The IRC also provides that any amount received (both annuity payments and withdrawals) under an annuity contract which is included in income may be subject to a tax penalty. The amount of the penalty is an additional tax equal to 10% of the amount that is includible in income. Some withdrawals will be exempt from the penalty. They include any amounts:

- 1) paid on or after you reach age 59½;
- 2) paid to your beneficiary after you die;
- 3) paid if you become totally disabled (as that term is defined in the IRC);
- 4) paid in a series of substantially equal periodic payments made annually (or more frequently) for your life or life expectancy or for the joint lives or joint life expectancies of you and your designated beneficiary;
- 5) paid under an immediate annuity; or
- 6) which come from investment in the contract made before August 14, 1982.

With respect to (4) above, if the series of substantially equal periodic payments is modified before the later of your attaining age 59½ or five years from the date of the first periodic payment, then the tax for the year of the modification is increased by an amount equal to the tax which would have been imposed (the 10% tax penalty), but for the exception, plus interest for the tax years in which the exception was used. The rules governing substantially equal periodic payments are complex. You should consult a tax adviser for more specific information.

Multiple Contracts

The IRC provides that multiple non-qualified annuity contracts which are issued within a calendar year to the same owner by one company or its affiliates are treated as one deferred annuity contract for purposes of determining the tax consequences of any distribution. Such treatment may result in adverse tax consequences including more rapid taxation of the distributed amounts from such combination of contracts. This rule does not apply to immediate annuities.

Tax Treatment of Assignments

An assignment or pledge of a contract may be a taxable event. You should consult a tax adviser if you wish to assign or pledge your contract. Annuity contracts issued after April 22, 1987 that are transferred for less than full and adequate consideration (including gifts) are subject to tax to the extent of gain in the contract. This does not apply to transfers between spouses or certain transfers incident to a divorce under IRC Section 1041.

Distributions After Death of Owner

In order to be treated as an annuity contract for federal income tax purposes, IRC Section 72(s) requires any non-qualified contract to contain certain provisions specifying how your interest in the contract will be distributed in the event of the death of an owner of the contract. Specifically, IRC Section 72(s) requires that a) if any owner dies on or after the annuity start date, but prior to the time the entire interest in the contract has been distributed, the entire interest in the contract will be distributed at least as rapidly as under the method of distribution being used as of the date of such owner's death; and b) if any owner dies prior to the annuity start date, the entire interest in the contract will be distributed within five years after the date of such owner's death. These requirements will be considered satisfied as to any portion of an owner's interest which is payable to or for the benefit of a designated beneficiary and which is distributed over the life of such designated beneficiary or over a period not extending beyond the life expectancy of that beneficiary, provided that such distributions begin within one year of the owner's death. The designated beneficiary refers to a natural person designated by the owner as a beneficiary and to whom ownership of the contract passes by reason of death. However, if the designated beneficiary is the surviving spouse of the deceased owner, the contract may be continued with the surviving spouse as the new owner. The non-qualified contracts contain provisions that are intended to comply with these IRC requirements, although no regulations interpreting these requirements have yet been issued. We intend to review such provisions and modify them if necessary to assure that they comply with the applicable requirements when such requirements are clarified by regulation or otherwise.

Taxation of Qualified Contracts. If you have no cost basis for your interest in a qualified contract, the full amount of any distribution is taxable to you as ordinary income. If you do have a cost basis for all or some of your interest, a portion of the distribution is taxable, generally based on the ratio of your cost basis to your total contract value. Special tax rules may be available for certain distributions from a qualified plan.

IRC Section 72(t) imposes a 10% penalty tax on the taxable portion of any distribution from qualified plans, including contracts issued and qualified under IRC Sections 401 (pension and profit-sharing plans), 403 (TSAs), 408 (IRAs), and 408A (Roth IRAs). Exceptions from the penalty tax are as follows:

- 1) distributions made on or after you reach age 59½;
- 2) distributions made after your death;
- 3) distributions made that are attributable to the employee being disabled as defined in the IRC;
- 4) after severance from employment, distributions that are part of a series of substantially equal periodic payments made not less frequently than annually for your life (or life expectancy) or the joint lives (or joint life expectancies) of you and your designated beneficiary (in applying this exception to distributions from IRAs, a severance of employment is not required);
- 5) distributions made after severance from employment if you have reached age 55 (not applicable to distributions from IRAs);
- 6) distributions made to you up to the amount allowable as a deduction to you under IRC Section 213 for amounts you paid during the taxable year for medical care;
- 7) distributions made on account of an IRS levy made on a qualified retirement plan or IRA;
- 8) distributions made to an alternate payee pursuant to a qualified domestic relations order (not applicable to distributions from IRAs);
- 9) distributions from an IRA for the purchase of medical insurance (as described in IRC Section 213(d)(1)(D)) for you and your spouse and dependents if you received unemployment compensation for at least 12 weeks and have not been re-employed for at least 60 days;
- 10) certain qualified reservist distributions;
- 11) distributions from an IRA to the extent they do not exceed your qualified higher education expenses (as defined in IRC Section 72(t)(7)) for the taxable year; and
- 12) distributions from an IRA which are qualified first-time homebuyer distributions (as defined in IRC Section 72(t)(8)).

With respect to (4) above, if the series of substantially equal periodic payments is modified before the later of your attaining age 59½ or five years from the date of the first periodic payment, then the tax for the year of the modification is increased by an amount equal to the tax which would have been imposed (the 10% penalty tax) but for the exception, plus interest for the tax years in which the exception was used. The IRS has indicated that a modification will occur if, after the first valuation date, there is:

- i) any addition to the account balance other than gains or losses;
- ii) any non-taxable transfer of a portion of the account balance to another retirement plan; or
- iii) a rollover by the individual of the amount received resulting in such amount not being taxable.

The rules governing substantially equal periodic payments are complex. You should consult a tax adviser or IRS Revenue Ruling 2002-62 for more specific information.

Tax-Sheltered Annuities Taxation and Withdrawal Restrictions. Under IRS regulations, effective January 1, 2009, all TSA plans must have a written plan document which specifies the requirements that each contract must meet in order to be qualified under the plan. In addition, the document must provide a list of the providers and contracts that are permitted to be purchased by TSA plan participants under the plan. TSA plan participants should be aware that if a TSA plan removes the provider or specific contract type that the TSA plan participant owns from its approved list, the TSA plan participant may be restricted from making further salary reduction contributions into that contract. TSA plans also have the right to restrict the ability to take loans and hardship withdrawals from a TSA contract. Because a plan participant may own more than one TSA contract, before we process a transaction we may require the TSA plan to approve the transaction to ensure that rules regarding loans, hardships and distribution restrictions are met. TSA plan participants should contact their individual TSA plan to determine the specific rules that apply to them.

The IRS regulations also make significant changes to Revenue Ruling 90-24 exchanges or transfers. Under the regulations an exchange may only be done when the TSA plan allows TSA exchanges under its plan and the provider of the new TSA contract agrees to share information with the TSA plan to ensure that the requirements of the TSA plan are met. Given this restriction, before a TSA exchange is processed, the TSA plan is required to approve the transaction or provide a list of vendors for which it has an information sharing agreement (ISA). Additionally, because most of the regulations were not effective until 2009, there was great uncertainty about their application to contract exchanges that took place between September 24, 2007 and January 1, 2009. Because of this uncertainty, it is possible that an exchange that took place prior to January 1, 2009 caused a TSA plan participant to incur taxation on the value of the contract. However, it is also possible that such an exchange did not have adverse tax consequences. If a TSA plan participant exchanged a contract to a TSA contract with a provider that does not have an ISA with the TSA plan, the participant had until July 1, 2009 to avoid adverse tax consequences by exchanging the contract for a TSA contract with which the TSA plan does have an ISA.

The IRC limits the withdrawal of purchase payments made by TSA plan participants through salary reductions from certain TSAs. Withdrawals of salary reduction amounts and their earnings can be made when a TSA plan participant:

- 1) reaches age 59½;
- 2) has a severance from employment;
- 3) dies;
- 4) becomes disabled, as that term is defined in the IRC; or
- 5) the TSA plan terminates (starting January 1, 2009).

In the case of hardship, the TSA plan participant can only withdraw the purchase payments and not any earnings. The TSA plan participant is required to suspend salary reduction contributions to any other TSA contract for a six-month period following the date of hardship distribution.

TSA contract value as of December 31, 1988 and contract amounts attributable to service with a former employer are not subject to these restrictions. Additionally, return of excess contributions or amounts paid to a spouse as a result of a qualified domestic relations order are not subject to these restrictions.

TSA contracts issued January 1, 2009 and after are subject to distribution restrictions on employer contributions. These restrictions are determined by the TSA plan and can be based on criteria such as completing years of service or attaining a stated age.

Withdrawal Restrictions – Governmental 457(b) Deferred Compensation Contract. Amounts may not be paid to a participant of a governmental 457(b) deferred compensation plan prior to the participant's:

- attainment of age 70½;
- severance from employment;
- incurring an unforeseeable emergency; or
- compliance with a qualified domestic relations order (QDRO).

In certain circumstances, amounts may also be distributed upon termination of the deferred compensation plan or if the contract contains \$5,000 or less, as provided by the plan.

Governmental 457(b) deferred compensation plans are subject to the required minimum distribution rules of IRC Section 401(a)(9). The sections of this prospectus related to qualified contracts contain more detailed information regarding these rules.

Required Minimum Distributions for Qualified Contracts For qualified contracts other than Roth IRAs, distributions generally must begin no later than April 1st of the calendar year following the later of:

- a) the calendar year in which you attain age 70½; or
- b) the calendar year in which you retire.

The date set forth in (b) does not apply to an IRA or to a five-percent owner of the employer maintaining the plan. Required distributions generally must be over a period not exceeding your life or life expectancy or the joint lives or joint life expectancies of you and your designated beneficiary. Upon your death, additional distribution requirements are imposed. If your contract has not entered the income phase and your death occurs after your required beginning date, distributions must be made at least as rapidly as under the method in effect at the time of your death or over the life or life expectancy of the designated beneficiary. If your contract has not entered the income phase and your death occurs before your required beginning date, the remaining interest must be distributed within five years or over the life or life expectancy of the designated beneficiary. If your death occurs after your contract has entered the income phase, distributions must be made at least as rapidly as under the method in effect at the time of your death. If your contract is held as a Roth IRA, there are no required minimum distributions during your life. However, upon your death your beneficiary is subject to required minimum distribution requirements. Any remaining interest must be distributed within five years or over your beneficiary's life expectancy. If required minimum distributions are not made, a 50% penalty tax is imposed on the amount that should have been distributed.

The Regulations under IRC Section 401(a)(9) include a provision that could increase the dollar amount of required minimum distributions for individuals who fund their IRA or qualified retirement plan with an annuity contract. During the accumulation phase of the annuity contract, Treasury Regulations Section 1.401(a)(9)-6, Q&A-12 requires that individuals add the actuarial present value of any additional benefits provided under the annuity (such as certain living or death benefits) to the dollar amount credited to the owner or beneficiary under the contract in order to determine the fair market value of the contract. A larger fair market value will result in the calculation of a higher required minimum distribution amount. You should consult a tax adviser to determine how this may impact your specific circumstances.

Taxation of Death Benefit Proceeds. Amounts may be distributed from a contract because of your death or the death of the annuitant. Generally, such amounts are includible in the income of the recipient as follows:

- i) if distributed in a lump sum, they are taxed in the same manner as a full withdrawal of the contract; or
- ii) if distributed under a payout option, they are taxed in the same way as annuity payments.

Section 1035 Tax Free Exchanges. IRC Section 1035 provides that a life insurance, endowment, or annuity contract may be exchanged for an annuity contract on a tax free basis. When this type of exchange occurs, the gain in the original contract is preserved in the new contract by transferring the cost basis under the original contract to the new contract. The IRS has provided guidance on the partial exchange of an annuity contract for another annuity contract. According to the guidance, partial exchanges occurring on or after October 24, 2011 will be tax free if no distribution takes place from either contract within 180 days after the exchange. If a distribution occurs within 180 days after the exchange, the IRS will apply general tax principles to determine the tax treatment of the transfer. The limitation on distributions within 180 days does not apply to annuity payments that are based on life expectancy or on a period certain of ten or more years. You should consult a tax adviser before entering into any 1035 exchange.

Partial exchanges which occurred prior to October 24, 2011 were subject to more restrictive guidance. You should consult a tax adviser if you have questions regarding the taxation of a prior exchange.

Beginning January 1, 2010, the Pension Protection Act of 2006 permits the exchange of an annuity contract for a qualified long-term care contract to qualify as a tax free 1035 exchange. However, if an annuity contract has entered the income phase, there is uncertainty and a lack of guidance regarding whether the exchange can qualify. Therefore, if an annuity contract has entered the income phase and the contract or the resulting annuity payments are exchanged for a qualified long-term care contract, we will not treat that as a tax free 1035 exchange.

The IRS has also issued guidance allowing a beneficiary of a non-qualified annuity contract to enter into a 1035 exchange of the death benefit for a new annuity contract, provided that the new contract will be administered as if the owner is deceased for purposes of the death benefit requirements of IRC Section 72(s). In order to allow the death benefit under a non-qualified annuity contract to be exchanged, we may require additional documentation from the issuer of the new contract, in order to ensure that this requirement is met.

Income Tax Reporting and Withholding. Federal law requires that we file an information return on Form 1099-R with the IRS (with a copy to you) reporting any taxable amounts paid to you under the annuity contract. By January 31st of the calendar year following the year of any payment(s), we will issue the Form 1099-R to the owner of the annuity contract. Following the death of the owner the Form 1099-R will be sent to each beneficiary who receives a payment under the contract.

The portion of any distribution that is includible in the gross income of the owner is subject to federal income tax withholding. The amount of the withholding depends on the type of distribution. Withholding for periodic payments is at the same rate as wages and at the rate of 10% from non-periodic payments. However, the owner, in most cases, may elect not to have taxes withheld or to have withholding done at a different rate (but not lower). Distributions from certain retirement plans, excluding IRAs, that are not directly rolled over to another eligible retirement plan or IRA, are subject to a mandatory 20% withholding. The 20% withholding requirement generally does not apply to:

- a) a series of substantially equal payments made at least annually for:
 - i) the life or life expectancy of the owner, or joint and last survivor expectancy of the owner and a designated beneficiary; or
 - ii) for a specified period of ten years or more;
- b) distributions which are required minimum distributions; or
- c) hardship distributions from a 401(k) plan or a tax-sheltered annuity.

You should consult a tax adviser regarding withholding requirements.

Generation Skipping Transfer Tax Withholding. Under certain circumstances, the IRC may impose a generation skipping transfer tax when all or part of an annuity contract is transferred to, or a death benefit is paid to, an individual two or more generations younger than the owner. Regulations issued under the IRC may require us to deduct the tax from your contract, or from any applicable payment, and pay it directly to the IRS.

Medicare Hospital Insurance Tax. A Medicare Hospital Insurance Tax (known as the Unearned Income Medicare Contribution) applies to all or part of a taxpayer's net investment income, at a rate of 3.8%, when certain income thresholds are met. Net investment income is defined to include, among other things, non-qualified annuities and net gain attributable to the disposition of property. Under final tax regulations, the taxable portion of any distribution from a non-qualified annuity contract – including surrenders, withdrawals, and annuity payments – is included in net investment income. Net investment income also includes the gain from the sale of a non-qualified annuity contract. Under current guidance, we are required to report to the IRS whether a distribution is potentially subject to the tax. You should consult a tax adviser as to the potential impact of the Medicare Hospital Insurance Tax on your contract.

Non-Resident Aliens and Foreign Entities. Generally, a distribution from a contract to a non-resident alien or foreign entity is subject to federal tax withholding at a rate of 30% of the amount of income that is distributed. A non-resident alien is a person who is neither a citizen, nor a resident, of the United States of America (U.S.). We are required to withhold the tax and send it to the IRS. Some distributions to non-resident aliens or foreign entities may be subject to a lower (or no) tax if a treaty applies. In order to obtain the benefits of such a treaty, the non-resident alien must claim the treaty benefit on Form W-8BEN (or the equivalent form), providing us with:

- 1) proof of residency (in accordance with IRS requirements); and
- 2) the applicable individual taxpayer identification number.

If the above conditions are not met, we will withhold 30% of the income from the distribution. Additionally, under the Foreign Account Tax Compliance Act effective July 1, 2014, U.S. withholding may occur with respect to certain entity owners (including foreign financial institutions and non-financial foreign entities (such as corporations, partnerships, and trusts)) at a 30% rate without regard to lower treaty rates.

Civil Unions and Domestic Partnerships. Parties to a civil union or domestic partnership are not treated as spouses under federal law. Consequently, certain transactions, such as a change of ownership or continuation of the contract after death, may be taxable to those individuals. You should consult a tax adviser for more information on this subject.

Non-Natural Owner. When a non-qualified contract is owned by a non-natural person (e.g., a corporation, limited liability company, partnership, trust or certain other entities) the contract will generally not be treated as an annuity for tax purposes. This means that gain in the contract will be taxed each year while the contract is in the accumulation phase. This treatment is not generally applied to a contract held by a trust or other entity as an agent for a natural person. If any beneficiary (including a contingent beneficiary) of a trust is a non-natural person, the contract will not be treated as owned by an agent for a natural person, and gain in the contract will be taxed annually, whether or not the trust is a grantor trust for income tax purposes. This treatment also does not apply to a contract that qualifies as an immediate annuity. Before purchasing a contract to be owned by a non-natural person or changing ownership on an existing contract that will result in it being owned by a non-natural person, you should consult a tax adviser to determine the tax impact.

Other Information

Distribution

The certificates are no longer for sale to the public. Pursuant to separate underwriting agreements with the Company, on its own behalf and on behalf of the Separate Account, MML Investors Services, LLC (MMLIS), a subsidiary of MassMutual, serves as principal underwriter of the contracts sold by its registered representatives, and MML Strategic Distributors, LLC (MSD), a subsidiary of MassMutual, serves as principal underwriter of the contracts sold by registered representatives of other broker-dealers who have entered into distribution agreements with MSD.

Both MMLIS and MSD are registered with the SEC as broker-dealers under the Securities Exchange Act of 1934 and are members of the Financial Industry Regulatory Authority (FINRA). Commissions for sales of the certificate by MMLIS registered representatives are paid on behalf of MMLIS to its registered representatives. Commissions for sales of the certificate by registered representatives of other broker-dealers are paid on behalf of MSD to those broker-dealers. MMLIS and MSD also receive compensation for their actions as principal underwriters of the certificates. We also pay expense allowances in connection with the sales of the certificates. The maximum commission payable for the certificate is 8.63% of purchase payments made to a certificate and/or up to 2.4% of certificate value annually.

Additional Compensation Paid to MMLIS. Most MMLIS registered representatives are also MassMutual insurance agents, and as such, are eligible for certain cash and non-cash benefits from MassMutual. Cash compensation includes bonuses and allowances based on factors such as sales, productivity and persistency. Non-cash compensation includes various recognition items such as prizes and awards as well as attendance at, and payment of the costs associated with attendance at, conferences, seminars and recognition trips, and also includes contributions to certain individual plans such as pension and medical plans. Sales of the certificate may help these registered representatives and their supervisors qualify for such benefits. MMLIS registered representatives who are also general agents or sales managers of MassMutual also may receive overrides, allowances and other compensation that is based on sales of the certificate by their registered representatives.

Additional Compensation Paid to Certain Broker-Dealers. We and MSD make additional commission payments to certain broker-dealers in the form of asset-based payments and sales-based payments. We also make cash payments and non-cash payments to certain broker-dealers. The asset-based and sales-based payments are made to participate in those broker-dealers' preferred provider programs or marketing support programs, or to otherwise promote the certificate. Asset-based payments are based on the value of the assets in the MassMutual certificates sold by that broker-dealer. Sales-based payments are paid on each sale of the certificate and each subsequent purchase payment applied to the certificate. Cash payments are made to attend sales conferences and educational seminars sponsored by certain broker-dealers. Non-cash payments include various promotional items. **For a list of the broker-dealers to whom we currently pay additional compensation for selling the certificate, visit www.MassMutual.com/legal/compensation-arrangements or call our Service Center at the number shown on page 1 of this prospectus.**

The additional compensation arrangements described in the preceding paragraphs are not offered to all broker-dealers and the terms of such arrangements may differ among broker-dealers. Some broker-dealers may receive two or more of these payments. Such payments may give us greater access to the registered representatives of the broker-dealers that receive such compensation or may influence the way that a broker-dealer markets the certificate. Any such compensation will be paid by MSD or us and will not result in any additional direct charge to you.

The additional compensation arrangements may provide a registered representative with an incentive to sell the certificate over other available variable annuity certificates whose issuers do not provide such compensation or who provide lower levels of such compensation. Your registered representative typically receives a portion of the compensation that is payable to his or her broker-dealer, depending on the agreement between the representative and their firm. MassMutual is not involved in determining compensation paid to a registered representative of an unaffiliated broker-dealer. You may contact your broker-dealer or registered representative to find out more information about the compensation they may receive in connection with your purchase of a certificate. You may want to take these compensation arrangements into account when evaluating any recommendations regarding the certificate.

We intend to recoup a portion of the cash and non-cash compensation payments that we make through the assessment of certain charges described in this prospectus, including the contingent deferred sales charge. We may also use some of the 12b-1 distribution fee payments and other payments that we receive from certain funds to help us make these cash and non-cash payments.

Special Arrangements

For certain group or sponsored arrangements there may be expense savings that could be passed on to the customer because our cost for sales, administration, and mortality generally vary with the size of the customer. We will consider factors such as the size of the group, the nature of the sale, the expected purchase payment volume, and other factors we consider significant in determining whether to reduce charges. Subject to applicable state laws and regulations, we reserve the right to reduce or waive

the administrative charge, the annual certificate maintenance charge or any other charge that is appropriate to reflect any expense savings. We will make any reductions according to our rules in effect when an application for a certificate is approved. We may change these rules from time to time. Any reduction in charges will reflect differences in costs or services, and will not be unfairly discriminatory.

We reserve the right to modify or terminate this arrangement.

Assignment

You can assign the certificate at any time during your lifetime. We will not be bound by the assignment until we receive written notice of the assignment in good order. We will not be liable for any payment or other action we take in accordance with the certificate before we receive notice of the assignment. You may be subject to tax consequences if you assign your certificate.

If the certificate is issued pursuant to a qualified plan, there may be limitations on your ability to assign the certificate. If you assign your certificate, your rights may only be exercised with the consent of the assignee of record.

We are not responsible for the validity of an assignment.

Unclaimed Property

Every state has some form of unclaimed property law that imposes varying legal and practical obligations on insurers and, indirectly, on contract owners, beneficiaries, and any other payees of proceeds from a contract. Unclaimed property laws generally provide for the transfer of benefits or payments under various circumstances to the abandoned property division or unclaimed property office in the state of last residence. This process is known as escheatment. To help avoid escheatment, keep your own information, as well as beneficiary and any other payee information up-to-date, including: full names, postal and electronic media addresses, telephone numbers, dates of birth, and social security numbers. To update this information, contact our Service Center.

Voting Rights

We are the legal owner of the fund shares. When a fund solicits proxies in conjunction with a vote of shareholders, we are required to obtain, from you and other participants, instructions as to how to vote those shares. When we receive those instructions, we will vote all of the shares for which we have not received voting instructions, in proportion to those instructions. This will also include any shares that we own on our own behalf. This may result in a small number of participants controlling the outcome of the vote. If we determine that we are no longer required to comply with the above, we will vote the shares in our own right.

During the accumulation phase of your certificate, we determine the number of shares you may vote by dividing your certificate value in each fund, if any, by \$100. Fractional shares are counted. During the income phase or after the annuitant dies, we determine the number of shares you may vote based on our liability for future variable monthly annuity payments.

Changes to the Certificate

We reserve the right to amend the certificate to meet the requirements of applicable federal or state laws or regulations, or as otherwise provided in the certificate. We will notify you by written notice of such amendments.

Suspension of Payments or Transfers

We may be required to suspend or postpone transfers from the funds or payments from the funds for withdrawals or death benefits during any period when:

- the NYSE is closed (other than customary weekend and holiday closings);
- trading on the NYSE is restricted;
- an emergency exists as a result of which disposal of shares of the funds is not reasonably practicable or we cannot reasonably value the shares of the funds; or
- during any other period when the SEC, by order, so permits for your protection.

We reserve the right to defer payment for a withdrawal from The Fixed Account for the period permitted by law but not for more than six months.

If, pursuant to the SEC's rules, a money market fund (Fund) suspends payment of redemption proceeds in connection with a liquidation of the Fund, we will delay payment of any transfer, withdrawal or death benefit from the applicable money market sub-account until the Fund is liquidated.

Termination of Certificate

We will terminate your certificate upon the occurrence of any of the following events:

- 1) the date of the last annuity payment;

- 2) the date payment is made of the entire certificate value;
- 3) the date of the last payment upon death to the last beneficiary; or
- 4) the date your certificate is returned under the right to examine certificate provision.

Anti-Money Laundering

Federal laws designed to counter terrorism and prevent money laundering might, in certain circumstances, require us to reject a purchase payment or block a participant's ability to make certain transactions and thereby refuse to accept any request for transfers, withdrawals, or death benefits, until instructions are received from the appropriate regulator. We may also be required to provide additional information about you and your certificate to government regulators.

Our Ability to Make Payments Under the Contract

Our Claims Paying Ability. Our "claims-paying ability" is our ability to meet any contractual obligation we have to make payments under the contract. These amounts include death benefits, annuity payments, withdrawals and any amounts paid out through the contract's additional features. It is important to note that there is no guarantee that we will always be able to meet our claims-paying obligations, and as with any insurance product, there are risks to purchasing the contract. For this reason, you should consider our financial strength and claims-paying ability to meet our obligations under the contract when purchasing a contract and making investment decisions.

Obligations of Our Separate Account. Contract value you allocate to the funds is maintained in our separate account. Any withdrawals or transfers of contract value from the funds will be taken from the separate account. We cannot use the separate account's assets to pay any of our liabilities other than those arising from the contracts. See "Investment Choices – The Separate Account."

Obligations of Our General Account. Contract value you allocate to the fixed accounts is maintained in our general account. The assets of our general account support our insurance and annuity obligations and are subject to our general liabilities from our business operations and to claims by our creditors. We use general account assets for many purposes including to pay death benefits, annuity payments, withdrawals and transfers from the fixed accounts and to pay amounts we provide to you through an elected additional feature that are in excess of your contract value allocated to the separate account.

Because of exemptive and exclusionary provisions, the general account, unlike the separate account, has not been registered under the 1933 Act or the 1940 Act. Because of this, the general account is generally not subject to the provisions of the 1933 Act or the 1940 Act. However, disclosures regarding the general account are subject to certain generally applicable provisions of the federal securities laws that require complete and accurate statements in prospectuses.

Our Financial Statements

We encourage both existing and prospective owners to read and understand our financial statements and those of the separate account. Our audited statutory financial statements and the separate account's audited U.S. GAAP financial statements are included in the SAI. You can request an SAI by contacting our Service Center at the number or address on page 1 of this prospectus.

Computer System Failures and Cybersecurity

The Company and its business partners rely on computer systems to conduct business, including customer service, marketing and sales activities, customer relationship management and producing financial statements. While the Company and its business partners have policies, procedures, automation and backup plans designed to prevent or limit the effect of failures, our respective computer systems may be vulnerable to disruptions or breaches as the result of natural disasters, man-made disasters, criminal activity, pandemics, or other events beyond our control. The failure of our or our business partners' computer systems for any reason could disrupt operations, result in the loss of customer business and adversely impact profitability.

The Company and its business partners retain confidential information on our respective computer systems, including customer information and proprietary business information. Any compromise of the security of our or our business partners' computer systems that results in the disclosure of personally identifiable customer information could damage our reputation, expose us to litigation, increase regulatory scrutiny and require us to incur significant technical, legal, and other expenses.

Legal Proceedings

The Company is subject to legal and regulatory actions, including class action lawsuits, in the ordinary course of its business. Our pending legal and regulatory actions include proceedings specific to us, as well as proceedings generally applicable to business practices in the industry in which we operate. From time to time, we also are subject to governmental and administrative proceedings and regulatory inquiries, examinations, and investigations in the ordinary course of our business. In addition, we, along with other industry participants, may occasionally be subject to investigations, examinations, and inquiries (in some

cases industry-wide) concerning issues upon which regulators have decided to focus. Some of these proceedings involve requests for substantial and/or unspecified amounts, including compensatory or punitive damages.

While it is not possible to predict with certainty the ultimate outcome of any pending litigation proceedings or regulatory action, management believes, based on information currently known to it, that the ultimate outcome of all pending litigation and regulatory matters, after consideration of applicable reserves and rights to indemnification, is not likely to have a material adverse effect upon the Separate Account, the ability of the principal underwriter(s) to perform in accordance with its contracts with the Company on behalf of the Separate Account, or the ability of the Company to meet its obligations under the contract.

For more information regarding the Company's litigation and other legal proceedings, see the notes to the Company's financial statements contained within the SAI.

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To obtain a free copy of the Statement of Additional Information, return this request form to the address shown below or call our Service Center at (800) 272-2216.

To: MassMutual
Document Management Services – Annuities W360
P.O. Box 9067
Springfield, MA 01102-9067

Please send me the **Statement of Additional Information** for MassMutual's Panorama Premier (AN2000NSAI).

Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____

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Appendix A

Condensed Financial Information

The following schedules include accumulation unit values for the periods indicated. We have extracted some of this data from the separate account's audited financial statements. You should read this information in conjunction with the separate account's audited financial statements and related notes that are included in the Statement of Additional Information.

Accumulation Unit Values

Sub-Account	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2016	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2010	Dec. 31, 2009	Value at Inception Date
Fidelity® VIP Contrafund®	\$37.89	\$41.05	\$34.15	\$32.07	\$32.30	\$29.26	\$22.60	\$19.69	\$20.48	\$17.72	\$10.00(b)
Invesco V.I. Diversified Dividend	11.63	12.76	11.92	10.52	10.46	9.40	7.27	6.21	6.43	5.92	10.00(a)
Invesco V.I. Health Care	24.54	24.66	21.59	24.73	24.31	20.60	14.86	12.47	12.16	11.71	10.00(a)
Invesco V.I. Technology	6.15	6.27	4.70	4.80	4.56	4.17	3.38	3.08	3.29	2.75	10.00(a)
MML Aggressive Allocation	16.52	18.23	15.57	14.54	14.87	14.25	11.34	9.94	10.27	8.97	10.00(e)
MML Asset Allocation (k)	—	—	—	—	—	—	—	13.11	13.07	11.77	10.00(d)
MML Balanced Allocation	14.66	15.56	14.15	13.52	13.76	13.25	11.73	10.59	10.55	9.49	10.00(e)
MML Blend	18.97	20.11	17.70	16.40	16.62	15.18	12.80	11.52	11.15	10.05	10.00(f)
MML Blue Chip Growth	37.73	37.56	27.96	28.10	25.65	23.83	17.10	14.66	14.66	12.80	10.00(d)
MML Concentrated Growth (k)	—	—	—	—	—	—	—	8.17	8.35	7.41	10.00(c)
MML Conservative Allocation	14.42	15.16	14.02	13.44	13.68	13.20	12.02	10.94	10.82	9.81	10.00(e)
MML Emerging Growth (k)	—	—	—	—	—	—	—	4.79	5.20	4.21	10.00(a)
MML Enhanced Index Core Equity (k)	—	—	—	—	—	—	—	10.26	10.14	9.01	10.00(g)
MML Equity	14.76	16.63	14.56	13.12	13.78	12.52	9.53	8.33	8.77	7.75	10.00(f)
MML Equity Income	25.33	28.34	24.71	21.11	22.99	21.68	16.92	14.63	14.95	13.19	10.00(d)
MML Equity Index	18.86	20.09	16.79	15.27	15.34	13.74	10.57	9.28	9.26	8.20	10.00(f)
MML Focused Equity	19.19	19.27	16.07	13.84	15.45	13.99	10.31	—	—	—	10.00(h)
MML Foreign	13.05	15.74	13.11	13.11	13.87	15.12	12.69	10.81	12.17	11.79	10.00(c)
MML Fundamental Growth	18.24	18.38	14.64	14.34	13.73	12.56	9.65	—	—	—	10.00(h)
MML Fundamental Value	15.30	17.34	15.32	13.74	14.40	13.15	10.22	—	—	—	10.00(h)
MML Global	13.73	15.40	12.56	11.85	12.18	11.88	9.38	7.69	8.13	7.31	10.00(c)
MML Growth & Income	24.58	26.30	21.56	20.10	20.28	18.50	14.15	12.01	12.41	11.29	10.00(d)
MML Growth Allocation	15.81	17.22	15.05	14.18	14.49	13.89	11.48	10.17	10.36	9.14	10.00(e)
MML High Yield	15.51	16.31	15.33	13.37	13.75	13.85	12.70	11.05	10.59	—	10.00(i)
MML Income & Growth	21.72	24.94	21.53	18.76	19.04	17.68	14.39	13.03	12.52	11.36	10.00(b)
MML Inflation-Protected and Income	13.50	13.87	13.63	13.14	13.53	13.26	14.72	13.97	12.48	11.88	10.00(d)
MML Large Cap Growth	16.64	17.27	13.12	13.35	12.88	11.93	9.06	7.93	8.35	7.13	10.00(c)
MML Managed Bond	12.47	12.74	12.37	12.24	12.53	11.97	12.37	11.89	11.27	10.71	10.00(j)
MML Managed Volatility	14.18	15.09	14.03	13.72	13.51	13.12	11.29	10.12	10.68	9.64	10.00(a)

Sub-Account	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2016	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2010	Dec. 31, 2009	Value at Inception Date
MML Mid Cap Growth	\$64.50	\$66.86	\$54.32	\$51.83	\$49.22	\$44.07	\$32.69	\$29.14	\$29.92	\$23.69	\$10.00(b)
MML Mid Cap Value	35.43	41.30	37.50	30.86	31.75	27.60	21.46	18.65	19.03	16.07	10.00(c)
MML Moderate Allocation	15.22	16.33	14.61	13.86	14.15	13.59	11.72	10.50	10.54	9.42	10.00(e)
MML NASDAQ-100® (k)	—	—	—	—	—	—	—	5.04	4.95	4.20	10.00(a)
MML Short-Duration Bond	10.54	10.55	10.46	10.34	10.42	10.45	10.52	10.38	10.19	—	10.00(i)
MML Small Cap Equity	31.43	35.49	31.47	26.99	29.01	26.23	18.86	16.16	16.75	13.77	10.00(b)
MML Small Cap Growth Equity	34.55	36.84	30.42	27.36	29.23	27.99	19.12	17.09	18.29	15.17	10.00(f)
MML Small Cap Index (k)	—	—	—	—	—	—	—	17.11	17.26	13.93	10.00(c)
MML Small/Mid Cap Value	29.93	35.68	31.89	25.85	27.75	25.71	18.87	16.07	17.62	14.09	10.00(d)
MML Total Return Bond	10.27	10.45	10.31	10.22	10.37	10.07	10.41	—	—	—	10.00(h)
MML U.S. Government Money Market	8.90	8.91	9.01	9.12	9.25	9.38	9.51	9.65	9.78	9.92	10.00(e)
Oppenheimer Capital Appreciation	19.73	21.22	16.97	17.60	17.23	15.14	11.84	10.52	10.79	10.00	10.00(c)
Oppenheimer Conservative Balanced (l)	13.83	14.81	13.75	13.24	13.32	12.48	11.19	10.10	10.17	9.13	10.00(a)
Oppenheimer Discovery Mid Cap Growth	17.38	18.77	14.78	14.65	13.93	13.36	9.96	8.67	8.70	6.92	10.00(c)
Oppenheimer Global	31.63	36.95	27.42	27.78	27.10	26.87	21.40	17.90	19.79	17.31	10.00(c)
Oppenheimer Global Strategic Income	20.64	21.90	20.89	19.89	20.63	20.35	20.66	18.46	18.56	16.37	10.00(c)
Oppenheimer Government Money (o)	11.96	11.97	12.09	12.26	12.43	12.60	12.78	12.96	13.14	13.32	10.00(b)
Oppenheimer High Income (m), (n)	—	—	—	—	—	—	—	3.69	3.84	3.39	10.00(c)
Oppenheimer International Growth	28.92	36.40	29.23	30.28	29.69	32.45	26.14	21.69	23.70	20.94	10.00(b)
Oppenheimer Main Street	18.79	20.69	17.94	16.30	16.00	14.66	11.28	9.79	9.93	8.67	10.00(c)
Oppenheimer Total Return Bond (m)	14.21	14.56	14.12	13.87	13.93	13.17	13.37	12.29	11.51	10.48	10.00(b)
Panorama Growth (k)	—	—	—	—	—	—	—	12.98	13.13	11.53	10.00(b)
Panorama Total Return (k)	—	—	—	—	—	—	—	12.48	12.62	10.97	10.00(b)
PIMCO CommodityRealReturn®Strategy	4.88	5.77	5.73	5.06	6.90	8.60	10.22	9.86	10.82	8.83	10.00(p)
VY® Clarion Global Real Estate	13.44	14.94	13.71	13.82	14.19	12.64	12.36	9.97	10.68	9.34	10.00(p)

Accumulation Units Outstanding

Sub-Account	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2016	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2010	Dec. 31, 2009
Fidelity® VIP Contrafund® (b)	324,792	352,261	398,938	438,613	531,566	571,838	618,115	657,130	754,503	853,030
Invesco V.I. Diversified Dividend (a)	30,946	30,529	27,964	31,980	40,409	45,315	48,093	46,615	56,382	71,007
Invesco V.I. Health Care (a)	57,092	65,457	69,232	76,194	76,964	83,454	93,409	97,176	108,891	124,234
Invesco V.I. Technology (a)	62,507	68,005	64,328	69,502	80,735	88,518	111,627	115,201	161,504	189,139
MML Aggressive Allocation (e)	20,104	21,400	42,892	40,256	23,880	12,806	18,929	15,873	21,901	12,938
MML Asset Allocation (d), (k)	—	—	—	—	—	—	—	377,356	460,006	516,972
MML Balanced Allocation (e)	45,053	67,325	53,485	79,822	80,681	86,243	84,522	77,082	81,130	62,205
MML Blend (f)	506,846	533,531	612,112	702,150	783,685	847,515	913,599	872,899	889,535	951,053

Sub-Account	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2016	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2010	Dec. 31, 2009
MML Blue Chip Growth (d)	105,679	113,370	138,632	164,077	175,456	170,139	158,341	139,521	139,567	138,109
MML Concentrated Growth (c), (k)	—	—	—	—	—	—	—	282,439	352,522	425,463
MML Conservative Allocation (e)	22,026	16,550	21,849	18,239	54,807	41,549	32,797	45,655	42,169	31,053
MML Emerging Growth (a), (k)	—	—	—	—	—	—	—	62,330	76,616	80,139
MML Enhanced Index Core Equity (g), (k)	—	—	—	—	—	—	—	115,454	146,067	166,039
MML Equity (f)	178,848	188,666	200,970	220,376	245,242	276,866	303,683	337,757	377,811	409,416
MML Equity Income (d)	120,203	134,682	171,493	198,274	212,986	218,496	210,271	217,841	244,951	268,587
MML Equity Index (f)	99,482	113,817	119,119	127,904	138,932	151,180	169,796	193,362	212,081	256,639
MML Focused Equity (h)	991	1,023	1,426	1,452	1,196	7,195	—	—	—	—
MML Foreign (c)	73,060	77,152	91,203	112,430	119,311	132,233	150,070	161,901	171,324	191,096
MML Fundamental Growth (h)	1,512	1,513	1,522	2,217	2,227	2,062	—	—	—	—
MML Fundamental Value (h)	855	889	905	917	249	1,952	1,771	—	—	—
MML Global (c)	132,817	150,784	163,913	184,189	200,455	222,370	261,682	295,735	380,638	443,220
MML Growth & Income (d)	106,306	113,164	131,449	144,601	154,373	176,736	202,334	229,032	277,814	324,402
MML Growth Allocation (e)	19,261	18,304	16,711	17,163	10,088	9,303	8,608	2,383	2,251	—
MML High Yield (i)	74,080	70,123	68,968	71,290	66,483	27,609	6,993	2,805	847	—
MML Income & Growth (b)	217,870	233,925	262,623	302,263	338,094	391,451	428,964	478,179	542,866	638,462
MML Inflation-Protected and Income (d)	78,781	83,778	97,190	109,952	128,488	153,024	180,909	206,252	226,425	239,285
MML Large Cap Growth (c)	112,364	121,766	135,548	146,106	162,194	186,540	209,380	233,514	256,456	298,674
MML Managed Bond (j)	65,629	69,540	76,099	79,679	70,152	71,170	96,328	87,524	76,034	53,188
MML Managed Volatility (a)	90,079	106,845	115,897	139,782	148,644	174,660	205,525	213,342	256,309	298,447
MML Mid Cap Growth (b)	172,409	191,980	221,387	256,863	279,022	320,366	354,700	386,895	446,751	523,044
MML Mid Cap Value (c)	143,058	153,562	180,998	218,487	235,305	266,268	299,233	331,126	370,486	421,896
MML Moderate Allocation (e)	102,636	77,255	91,577	91,987	89,024	83,153	85,452	40,545	25,715	11,355
MML NASDAQ-100® (a), (k)	—	—	—	—	—	—	—	121,293	81,688	84,614
MML Short-Duration Bond (i)	26,914	23,946	49,439	52,791	64,738	25,830	8,260	6,118	2,165	—
MML Small Cap Equity (b)	83,507	94,575	112,290	124,850	133,277	140,297	151,988	159,340	176,101	198,249
MML Small Cap Growth Equity (f)	27,054	29,725	35,160	45,617	49,460	53,463	65,360	76,036	87,774	96,739
MML Small Cap Index (c), (k)	—	—	—	—	—	—	—	67,148	79,349	91,613
MML Small/Mid Cap Value (d)	30,870	34,357	43,741	47,414	52,049	50,502	48,575	52,539	59,743	67,274
MML Total Return Bond (h)	61,740	61,166	60,339	59,767	61,926	55,491	26,869	—	—	—
MML U.S. Government Money Market (e)	253,061	279,897	309,708	336,235	386,129	446,761	636,068	71,329	80,047	152,069
Oppenheimer Capital Appreciation (c)	223,917	251,695	277,419	300,419	339,071	390,962	469,700	550,047	655,809	749,673
Oppenheimer Conservative Balanced (a), (l)	86,678	95,552	115,799	126,999	150,199	179,847	229,337	230,612	341,089	439,751

Sub-Account	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2016	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2010	Dec. 31, 2009
Oppenheimer Discovery Mid Cap Growth (c)	112,927	139,743	159,848	180,300	190,365	216,325	260,207	282,464	334,434	376,604
Oppenheimer Global (c)	292,253	314,817	358,945	402,380	434,741	479,451	542,597	591,994	668,945	744,788
Oppenheimer Global Strategic Income (c)	297,786	312,992	350,828	384,727	428,661	512,120	588,636	605,828	684,344	770,056
Oppenheimer Government Money (b), (o)	75,480	74,584	78,129	86,865	130,230	157,130	157,696	220,233	265,636	401,797
Oppenheimer High Income (c), (m), (n)	—	—	—	—	—	—	—	193,583	221,637	287,681
Oppenheimer International Growth (b)	68,199	72,966	85,851	102,114	109,564	120,050	133,006	146,731	162,278	170,055
Oppenheimer Main Street (c)	326,750	343,601	379,176	408,394	438,920	503,992	605,210	623,794	760,065	876,697
Oppenheimer Total Return Bond (b), (m)	145,829	165,749	187,107	211,390	249,195	291,383	347,257	400,306	468,236	554,225
Panorama Growth (b), (k)	—	—	—	—	—	—	—	43,168	46,655	50,591
Panorama Total Return (b), (k)	—	—	—	—	—	—	—	39,263	48,851	60,014
PIMCO CommodityRealReturn [®] Strategy (p)	6,839	7,127	9,558	10,520	11,933	14,814	46,807	43,324	42,674	39,880
VY [®] Clarion Global Real Estate (p)	12,659	16,239	18,958	22,732	16,773	10,813	14,038	12,311	13,760	13,193

Notes to Condensed Financial Information

- a) Commencement of public offering was May 1, 2000.
- b) Commencement of public offering was September 1, 1998.
- c) Commencement of public offering was September 1, 1999.
- d) Commencement of public offering was May 1, 2003.
- e) Commencement of public offering was January 19, 2008.
- f) Commencement of public offering was May 1, 1999.
- g) Commencement of public offering was May 1, 2001.
- h) Commencement of public offering was May 1, 2012.
- i) Commencement of public offering was May 1, 2010.
- j) Commencement of public offering was May 1, 2009.
- k) Beginning April 30, 2012, this sub-account is unavailable as an investment choice.
- l) This sub-account is unavailable in certificates issued on or after April 30, 2012.
- m) Effective May 1, 2009 and after, you may not allocate any new money to this sub-account via purchase payments or transfers.
- n) Effective October 26, 2012, Oppenheimer High Income was merged into Oppenheimer Global Strategic Income.
- o) This sub-account is unavailable in certificates issued on or after January 19, 2008.
- p) Commencement of public offering was May 1, 2006.