PUTNAM CONVERTIBLE INCOME GROWTH TRUST
Form 40-17G
December 14, 2007

December 14 , 2007

Securities and Exchange Commission
450 Fifth Street, N.W.
Washington, DC 20549

Re: Filing under Rule 17g-1

Ladies and Gentlemen:

On behalf of the registered management investment companies listed in Schedule A hereto (the Funds), please be advised, pursuant to Rule 17g-1(g) under the Investment Company Act of 1940, as follows:

1. Enclosed as Exhibit 1 is a copy of the fidelity bonds covering the Funds for the period beginning November 1, 2007 and ending November 1, 2008, which is also the period for which premiums have been paid to date.

2. Enclosed as Exhibit 2 is a copy of each of the resolutions approved by the Trustees of the Funds approving the form and amount of the bond and the proportion of the total premium paid by the Funds. The relevant resolution was approved by a majority of the Trustees of the Putnam Funds, including a majority of disinterested Trustees, on November 9, 2007, and by a majority of the Trustees of TH Lee, Putnam Investment Trust, including a majority of disinterested Trustees, on December 12, 2007.

3. Enclosed as Exhibit 3 is a copy of the agreement entered into by the Funds required by Rule 17g-1(f).

4. Schedule A also lists the amount of fidelity bond coverage each Fund would have been required to maintain under Rule 17g-1(d) if it did not participate in the joint fidelity bond.

Please direct any comments you may have to me at (617) 760-1061.

Very truly yours,
/s/ Melissa A. LaBarge

Melissa A. LaBarge

FIDELITY BOND MONITOR

AS OF: October 31, 2007

Schedule A

FUND	GROSS ASSETS AS OF MOST RECENT MONTH END	MINIMUM BOND AMOUNT

Putnam High Yield Municipal Trust	192,806,947	600,000
Putnam Municipal Bond Fund	341,415,997	750,000
Putnam Muni Opportunities Trust	299,767,929	750,000
Putnam New Jersey Tax Exempt Income Fund	195,347,499	600,000
Putnam Pennsylvania Tax Exempt Income Fund	158,147,135	600,000
Putnam Capital Appreciation Fund	566,520,920	900,000
Putnam Massachusetts Tax Exempt Income Fund	282,550,158	750,000
Putnam Michigan Tax Exempt Income Fund	105,638,184	525,000
Putnam Minnesota Tax Exempt Income Fund	104,503,856	525,000
Putnam Ohio Tax Exempt Income Fund	150,153,499	600,000
Putnam Arizona Tax Exempt Income Fund	86,231,843	450,000
Putnam Europe Equity Fund	581,574,988	900,000
Putnam International Equity Fund	7,367,486,175	2,500,000
Putnam New Opportunities Fund	4,387,947,121	2,500,000
George Putnam Fund Of Boston	4,512,732,221	2,500,000
Putnam Investors Fund	3,883,906,576	2,300,000
Putnam Vista Fund	2,092,143,451	1,700,000
Putnam Voyager Fund	6,886,572,922	2,500,000
Putnam OTC & Emerging Growth Fund	677,779,586	900,000
Putnam Premier Income Trust	1,154,535,852	1,250,000
Emerging Opportunities THLee	70,680,832	400,000
Putnam High Yield Trust	2,121,943,088	1,700,000
Putnam Global Natural Resources Fund	826,795,922	1,000,000

Putnam Health Sciences Trust	1,941,759,332	1,500,000
Putnam High Income Securities Fund	181,293,816	600,000
Putnam Money Market Fund	4,537,942,267	2,500,000
Putnam Tax Exempt Income Fund	1,352,393,746	1,250,000
Putnam California Tax Exempt Income Fund	1,950,561,050	1,500,000
Putnam U.S. Government Income Trust	1,170,361,342	1,250,000
Putnam American Government Income Fund	686,975,817	900,000
Putnam Tax Exempt Money Market	84,022,721	450,000
Putnam Master Intermediate Trust	579,544,776	900,000
Putnam Diversified Income Trust	2,616,767,812	1,900,000
Putnam Fund for Growth & Income	13,514,475,659	2,500,000
Putnam Income Fund	2,458,443,256	1,700,000
Putnam Global Equity Fund	2,299,272,205	1,700,000
Putnam Convertible Income-Growth Trust	812,390,300	1,000,000
Putnam Global Income Trust	130,350,192	525,000
Putnam Managed Municipal Income Trust	505,114,472	900,000
Putnam Utilities Growth And Income Fund	666,956,842	900,000
Putnam Equity Income Fund	3,952,404,369	2,300,000
Putnam New York Tax Exempt Income Fund	1,140,572,087	1,250,000
Putnam Investment Grade Municipal Income Trust	340,281,086	750,000
Putnam High Yield Advantage Fund	752,942,645	1,000,000
Putnam Limited Duration Government Income Fund	464,865,705	750,000
Putnam Classic Equity Fund	666,942,396	900,000

Putnam Discovery Growth Fund		810,391,930	1,000,000
Putnam Assets Allocation Funds		6,599,996,147	2,500,000
Putnam Funds Trusts		11,930,858,102	2,500,000
Putnam Investment Funds		9,215,174,851	2,500,000
Putnam Retirement Ready Funds		755,626,988	1,000,000
Putnam Tax Free Funds		1,607,054,533	1,500,000
Putnam Tax Smart Funds Trust		260,324,988	750,000
Putnam Variable Trust Funds		15,718,633,153	2,500,000
	TOTALS:	**126,751,877,286**	**70,375,000**
		MINIMUM AMOUNT NEEDED:	**70,375,000**
		CURRENT BOND AMOUNT:	**80,000,000**
		AMOUNT IN EXCESS OF MIN. AMOUNT:	**9,625,000**

Exhibit 1

NATIONAL UNION FIRE INSURANCE COMPANY
OF PITTSBURGH, PA.
(A Stock Insurance Company, herein called the Underwriter)
175 Water Street
New York, NY 10038

INVESTMENT COMPANY BLANKET BOND

POLICY NUMBER: **060-88-79**

DECLARATIONS:

ITEM 1. Name of Insured (herein called Insured): THE GEORGE PUTNAM FUND OF BOSTON

Principal Address: ONE POST OFFICE SQUARE
BOSTON, MA 02109

ITEM 2. Bond Period: from **12:01 a.m. November 01, 2007** to **November 01, 2008** the effective date of the termination or cancellation of this bond, standard time at the Principal Address as to each of said dates.

ITEM 3. Limit of Liability Subject to Sections 9, 10 and 12 hereof,

	Limit of Liability/Deductible
Insuring Agreement (A)-Fidelity	$70,000,000/$150,000
Insuring Agreement (B)-Audit Expense	$250,000/$5,000
Insuring Agreement (C)-On Premises	$70,000,000/$150,000
Insuring Agreement (D)-In Transit	$70,000,000/$150,000
Insuring Agreement (E)-Forgery & Alteration	$70,000,000/$150,000
Insuring Agreement (F)-Securities	$70,000,000/$150,000
Insuring Agreement (G)-Counterfeit Currency	$70,000,000/$150,000
Insuring Agreement (H)-Stop Payment Liability	$250,000/$5,000
Insuring Agreement (I)- Uncollectible Item of Deposit	$250,000/$5,000
Insuring Agreement (J)-Computer Systems	$70,000,000/$150,000
Insuring Agreement (K)-Voice Initiated Funds Transfers	$70,000,000/$150,000
Insuring Agreement (L)-Telefacsimile Transfer Fraud	$70,000,000/$150,000
Insuring Agreement (M)-Automated Phone Systems	$70,000,000/$150,000
Insuring Agreement (N)-Unauthorized Signatures	$250,000/$5,000
Insuring Agreement (O)-Claims Expense	$250,000/$5,000
Insuring Agreement (P)-Destruction by Hacker	$70,000,000/$150,000
Insuring Agreement (Q)-Destruction by Virus	$70,000,000/$150,000

If Not Covered is inserted above opposite any specified Insuring Agreement or Coverage, such Insuring Agreement or Coverage and any other reference thereto in this bond shall be deemed to be deleted therefrom.

ITEM 4. Offices or Premises Covered-Offices acquired or established subsequent to the effective date of this bond are covered according to the terms of General Agreement A. All the Insureds offices or premises in existence at the time this bond becomes effective are covered under this bond except the offices or premises located as follows: **No Exceptions**

COPY

ITEM 5. The liability of the Underwriter is subject to the terms of the following riders attached thereto: Rider No. # 1, #2, #3, #4, #5, #6, #7, #8, #9, #10, #11, #12, #13, #14, #15, #16, #17, #18, #19, #20

ITEM 6. The Insured by the acceptance of this bond gives to the Underwriter terminating or canceling prior bond(s) or policy(ies) No.(s) 672-50-81 such termination or cancellation to be effective as of the time this bond becomes effective.

ITEM 7. Premium: $472,549

MARSH USA, INC.
1166 AVENUE OF THE AMERICAS
NEW YORK, NY 10036-2708

COPY

INVESTMENT COMPANY BLANKET BOND

The Underwriter, in consideration of an agreed premium, and subject to the Declarations made a part hereof, the General Agreements, Conditions and Limitations and other terms of this bond, agrees with the Insured, in accordance with the Insuring Agreements hereof to which an amount of insurance is applicable as set forth in Item 3 of the Declarations and with respect to loss sustained by the Insured at any time but discovered during the Bond Period, to indemnify and hold harmless the Insured for:

INSURING AGREEMENTS

(A) FIDELITY

Loss resulting from any dishonest or fraudulent act(s), including Larceny or Embezzlement committed by an Employee, committed anywhere and whether committed alone or in collusion with others, including loss of Property resulting from such acts of an Employee, which Property is held by the Insured for any purpose or in any capacity and whether so held gratuitously or not and whether or not the Insured is liable therefor.

Dishonest or fraudulent act(s) as used in this Insuring Agreement shall mean only dishonest or fraudulent act(s) committed by such Employee with the manifest intent:

(a) to cause the Insured to sustain such loss; and

(b) to obtain financial benefit for the Employee, or for any other person or organization intended by the Employee to receive such benefit, other than salaries, commissions, fees, bonuses, promotions, awards, profit sharing, pensions or other employee benefits earned in the normal course of employment.

(B) AUDIT EXPENSE

Expense incurred by the Insured for that part of the costs of audits or examinations required by any governmental regulatory authority to be conducted either by such authority or by an independent accountant by reason of the discovery of loss sustained by the Insured through any dishonest or fraudulent act(s), including Larceny or Embezzlement of any of the Employees. The total liability of the Underwriter for such expense by reason of such acts of any Employee or in which such Employee is concerned or implicated or with respect to any one audit or examination is limited to the amount stated opposite Audit Expense in Item 3 of the Declarations; it being understood, however, that such expense shall be deemed to be a loss sustained by the Insured through any dishonest or fraudulent act(s), including Larceny or Embezzlement of one or more of the Employees and the liability under this paragraph shall be in addition to the Limit of liability stated in Insuring Agreement (A) in Item 3 of the Declarations.

(C) ON PREMISES

Loss of Property (occurring with or without negligence or violence) through robbery, burglary, Larceny, theft, holdup, or other fraudulent means, misplacement, mysterious unexplainable disappearance, damage thereto or destruction thereof, abstraction or removal from the possession, custody or control of the Insured, and loss of subscription, conversion, redemption or deposit privileges through the misplacement or loss of Property, while the Property is (or is supposed or believed by the Insured to be) lodged or deposited within any offices or premises located anywhere, except in an office listed in Item 4 of the Declarations or amendment thereof or in the mail or with a carrier for hire other than an armored motor vehicle company, for the purpose of transportation.

Offices and Equipment

(1) Loss of or damage to, furnishings,

fixtures, stationery, supplies or equipment, within any of the Insured's offices covered under this bond caused by Larceny or theft in, or by burglary, robbery or holdup of such office, or attempt thereat, or by vandalism or malicious mischief; or

(2) loss through damage to any such office by Larceny or theft in, or by burglary, robbery or holdup of such office or attempt thereat, or to the interior of any such office by vandalism or malicious mischief provided, in any event, that the Insured is the owner of such offices, furnishings, fixtures, stationery, supplies or equipment or is legally liable for such loss or damage, always excepting, however, all loss or damage through fire.

(D) IN TRANSIT

Loss of Property (occurring with or without negligence or violence) through robbery, Larceny, theft, holdup, misplacement, mysterious unexplainable disappearance, being lost or otherwise made away with, damage thereto or destruction thereof, and loss of subscription, conversion, redemption or deposit privileges through the misplacement or loss of Property, while the Property is in transit anywhere in the custody of any person or persons acting as messenger, except while in the mail or with a carrier for hire, other than an armored motor vehicle company, for the purpose of transportation, such transit to begin immediately upon receipt of such Property by the transporting person or persons, and to end immediately upon delivery thereof at destination.

(E) FORGERY OR ALTERATION

Loss through FORGERY or ALTERATION of, on or in any bills of exchange, checks, drafts, acceptances, certificates of deposit. promissory notes, or other written promises, orders or directions to pay sums certain in money, due bills, money orders, warrants, orders upon public treasuries, letters of credit, written instructions, advices or applications directed to the Insured, authorizing or acknowledging the transfer, payment, delivery or receipt of funds or Property, which instructions or advices or applications purport to have been signed or endorsed by any customer of the Insured, shareholder or subscriber to shares, whether certificated or uncertificated, of any Investment Company or by any financial or banking institution or stockbroker but which instructions, advices or applications either bear the forged signature or endorsement or have been altered without the knowledge and consent of such customer, shareholder or subscriber to shares, whether certificated or uncertificated, of an Investment Company, financial or banking institution or stockbroker, withdrawal orders or receipts for the withdrawal of funds or Property, or receipts or certificates of deposit for Property and bearing the name of the Insured as issuer, or of another Investment Company for which the Insured acts as agent, excluding, however, any loss covered under Insuring Agreement (F) hereof whether or not coverage for Insuring Agreement (F) is provided for in the Declarations of this bond.

Any check or draft (a) made payable to a fictitious payee and endorsed in the name of such fictitious payee or (b) procured in a transaction with the maker or drawer thereof or with one acting as an agent of such maker or drawer or anyone impersonating another and made or drawn payable to the one so impersonated and endorsed by anyone other than the one impersonated, shall be deemed to be forged as to such endorsement.

Mechanically reproduced facsimile signatures are treated the same as handwritten signatures.

(F) SECURITIES

Loss sustained by the Insured, including loss sustained by reason of a violation of the constitution, by-laws, rules or regulations of any

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Self Regulatory Organization of which the Insured is a member or which would have been imposed upon the Insured by the constitution, by-laws, rules or regulations of any Self Regulatory Organization if the Insured had been a member thereof,

(1) through the Insureds having, in good faith and in the course of business, whether for its own account or for the account of others, in any representative, fiduciary, agency or any other capacity, either gratuitously or otherwise, purchased or otherwise acquired, accepted or received, or sold or delivered, or given any value, extended any credit or assumed any liability, on the faith of, or otherwise acted upon, any securities, documents or other written instruments which prove to have been

(a) counterfeited, or

(b) forged as to the signature of any maker, drawer, issuer, endorser, assignor, lessee, transfer agent or registrar, acceptor, surety or guarantor or as to the signature of any person signing in any other capacity, or

(c) raised or otherwise altered, or lost, or stolen, or

(2) through the Insureds having, in good faith and in the course of business, guaranteed in writing or witnessed any signatures whether for valuable consideration or not and whether or not such guaranteeing or witnessing is ultra vires the Insured, upon any transfers, assignments, bills of sale, powers of attorney, guarantees, endorsements or other obligations upon or in connection with any securities, documents or other written instruments and which pass or purport to pass title to such securities, documents or other written instruments; EXCLUDING, losses caused by FORGERY or ALTERATION of, on or in those instruments covered under Insuring Agreement (E) hereof.

Securities, documents or other written instruments shall be deemed to mean original (including original counterparts) negotiable or non-negotiable agreements which in and of themselves represent an equitable interest, ownership, or debt, including an assignment thereof which instruments are in the ordinary course of business, transferable by delivery of such agreements with any necessary endorsement or assignment.

The word "counterfeited" as used in this Insuring Agreement shall be deemed to mean any security, document or other written instrument which is intended to deceive and to be taken for an original.

Mechanically produced facsimile signatures are treated the same as handwritten signatures.

(G) COUNTERFEIT CURRENCY

Loss through the receipt by the Insured, in good faith, of any counterfeited money orders or altered paper currencies or coin of the United States of America or Canada issued or purporting to have been issued by the United States of America or Canada or issued pursuant to a United States of America or Canadian statute for use as currency.

(H) STOP PAYMENT

Loss against any and all sums which the Insured shall become obligated to pay by reason of the Liability imposed upon the Insured by law for damages:

For having either complied with or failed to comply with any written notice of any customer, shareholder or subscriber of the Insured or any Authorized Representative of such customer, shareholder or subscriber

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to stop payment of any check or draft made or drawn by such customer, shareholder or subscriber or any Authorized Representative of such customer, shareholder or subscriber, or

For having refused to pay any check or draft made or drawn by any customer, shareholder or subscriber of the Insured or any Authorized Representative of such customer, shareholder or subscriber.

(I) UNCOLLECTIBLE ITEMS OF DEPOSIT

Loss resulting from payments of dividends or fund shares, or withdrawals permitted from any customer’s, shareholder’s or subscriber’s account based upon Uncollectible Items of Deposit of a customer, shareholder or subscriber credited by the Insured or the Insured’s agent to such customer’s, shareholder’s or subscriber’s Mutual Fund Account; or

loss resulting from any Item of Deposit processed through an Automated Clearing House which is reversed by the customer, shareholder or subscriber and deemed uncollectible by the Insured.

Loss includes dividends and interest accrued not to exceed 15% of the Uncollectible Items which are deposited.

This Insuring Agreement applies to all Mutual Funds with “exchange privileges” if all Fund(s) in the exchange program are insured by a National Union Fire Insurance Company of Pittsburgh, PA for Uncollectible Items of Deposit. Regardless of the number of transactions between Fund(s), the minimum number of days of deposit within the Fund(s) before withdrawal as declared in the Fund(s) prospectus shall begin from the date a deposit was first credited to any Insured Fund(s).

GENERAL AGREEMENTS

A . ADDITIONAL OFFICES OR EMPLOYEES-CONSOLIDATION OR MERGER-NOTICE

1. If the Insured shall, while this bond is in force, establish any additional office or offices, such office or offices shall be automatically covered hereunder from the dates of their establishment, respectively. No notice to the Underwriter of an increase during any premium period in the number of offices or in the number of Employees at any of the offices covered hereunder need be given and no additional premium need be paid for the remainder of such premium period.

2. If an Investment Company, named as Insured herein, shall, while this bond is in force, merge or consolidate with, or purchase the assets of another institution, coverage for such acquisition shall apply automatically from the date

of acquisition. The Insured shall notify the Underwriter of such acquisition within 60 days of said date, and an additional premium shall be computed only if such acquisition involves additional offices or employees.

B. WARRANTY

No statement made by or on behalf of the Insured, whether contained in the application or otherwise, shall be deemed to be a warranty of anything except that it is true to the best of the knowledge and belief of the person making the statement.

C. COURT COSTS AND ATTORNEYS' FEES (Applicable to all Insuring Agreements or Coverages now or hereafter forming part of

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this bond)

The Underwriter will indemnify the Insured against court costs and reasonable attorneys' fees incurred and paid by the Insured in defense, whether or not successful, whether or not fully litigated on the merits and whether or not settled of any suit or legal proceeding brought against the Insured to enforce the Insured's liability or alleged liability on account of any loss, claim or damage which, if established against the Insured, would constitute a loss sustained by the Insured covered under the terms of this bond provided, however, that with respect to Insuring Agreement (A) this indemnity shall apply only in the event that

(1) an Employee admits to being guilty of any dishonest or fraudulent act(s), including Larceny or Embezzlement; or

(2) an Employee is adjudicated to be guilty of any dishonest or fraudulent act(s), including Larceny or Embezzlement;

(3) in the absence of (1) or (2) above an arbitration panel agrees, after a review of an agreed statement of facts, that an Employee would be found guilty of dishonesty if such Employee were prosecuted.

The Insured shall promptly give notice to the Underwriter of any such suit or legal proceeding and at the request of the Underwriter shall furnish it with copies of all pleadings and other papers therein. At the Underwriter's election the Insured shall permit the Underwriter to conduct the defense of such suit or legal proceeding, in the Insured's name, through attorneys of the Underwriter's selection. In such event, the Insured shall give all reasonable information and assistance which the Underwriter shall deem necessary to the proper defense of such suit or legal proceeding.

If the amount of the Insured's liability or alleged liability is greater than the amount recoverable under this bond, or if a Deductible Amount is applicable, or both, the liability of the Underwriter under this General Agreement is limited to the proportion of court costs and attorneys' fees incurred and paid by the Insured or by the Underwriter that the amount recoverable under this bond bears to the total of such amount plus the amount which is not so recoverable. Such indemnity shall be in addition to the Limit of Liability for the applicable Insuring Agreement or Coverage.

D. FORMER EMPLOYEE

Acts of an Employee, as defined in this bond, are covered under Insuring Agreement (A) only while the Employee is in the Insured's employ. Should loss involving a former Employee of the Insured be discovered subsequent to the termination of employment, coverage would still apply under Insuring Agreement (A) if the direct proximate cause of the loss occurred while the former Employee performed duties within the scope of his/her employment.

THE FOREGOING INSURING AGREEMENTS AND GENERAL AGREEMENTS ARE SUBJECT TO

THE FOLLOWING CONDITIONS AND LIMITATIONS:

SECTION 1. DEFINITIONS

The following terms, as used in this bond, shall have the respective meanings stated in this Section:

(a) "Employee" means:

(1) any of the Insured's officers, partners, or employees, and

(2) any of the officers or employees of any predecessor of the Insured whose principal assets are acquired by the Insured by consolidation or

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merger with, or purchase of assets or capital stock of such predecessor. and

(3) attorneys retained by the Insured to perform legal services for the Insured and the employees of such attorneys while such attorneys or the employees of such attorneys are performing such services for the Insured, and

(4) guest students pursuing their studies or duties in any of the Insured's offices, and

(5) directors or trustees of the Insured, the investment advisor, underwriter (distributor), transfer agent, or shareholder accounting record keeper, or administrator authorized by written agreement to keep financial and/or other required records, but only while performing acts coming within the scope of the usual duties of an officer or employee or while acting as a member of any committee duly elected or appointed to examine or audit or have custody of or access to the Property of the Insured, and

(6) any individual or individuals assigned to perform the usual duties of an employee within the premises of the Insured, by contract, or by any agency furnishing temporary personnel on a contingent or part-time basis, and

(7) each natural person, partnership or corporation authorized by written agreement with the Insured to perform services as electronic data processor of checks or other accounting records of the Insured, but excluding any such processor who acts as transfer agent or in any other agency capacity in issuing checks, drafts or securities for the Insured, unless included under Sub-section (9) hereof, and

(8) those persons so designated in Section 15, Central Handling of Securities, and

(9) any officer, partner or Employee of

a) an investment advisor,

b) an underwriter (distributor),

c) a transfer agent or shareholder accounting record-keeper, or

d) an administrator authorized by written agreement to keep financial and/or other required records,

for an Investment Company named as Insured while performing acts coming within the scope of the usual duties of an officer or Employee of any Investment Company named as Insured herein, or while acting as a member of any committee duly elected or appointed to examine or audit or have custody of or access to the Property of any such Investment Company, provided that only Employees or partners of a transfer agent, shareholder accounting record-keeper or administrator which is an affiliated person as defined in the Investment Company Act of 1940, of an Investment Company named as Insured or is an affiliated person of the adviser, underwriter or administrator of such Investment Company, and which is not a bank, shall be included within the definition of Employee.

Each employer of temporary personnel or processors as set forth in Sub-Sections (6) and of Section 1(a) and their partners, officers and employees shall collectively be deemed to be one person for all the purposes of this bond, excepting, however, the last paragraph of Section 13.

Brokers, or other agents under contract or representatives of the same general character shall not be considered Employees.

(b) "Property" means money (i.e.. currency, coin, bank notes, Federal Reserve notes), postage and revenue stamps, U.S. Savings Stamps, bullion, precious metals of all kinds and in any form and articles made therefrom, jewelry, watches, necklaces, bracelets, gems, precious and semi-precious stones, bonds, securities, evidences of debts, debentures, scrip, certificates, interim receipts, warrants, rights, puts, calls, straddles, spreads, transfers, coupons, drafts, bills of exchange, acceptances, notes, checks, withdrawal orders, money orders, warehouse receipts, bills of lading, conditional sales contracts, abstracts of title, insurance policies, deeds, mortgages under real estate and/or chattels and upon interests therein, and assignments of such policies, mortgages and instruments, and other valuable papers, including books of account and other records used by the Insured in the conduct of its business, and all other instruments similar to or in the nature of the foregoing including Electronic Representations of such instruments enumerated above (but excluding all data processing records) in which the Insured has an interest or in which the Insured acquired or should have acquired an interest by reason of a predecessor's declared financial condition at the time of the Insured's consolidation or merger with, or purchase of the principal assets of, such predecessor or which are held by the Insured for any purpose or in any capacity and whether so held by the Insured for any purpose or in any capacity and whether so held gratuitously or not and whether or not the Insured is liable therefor.

(c) "Forgery" means the signing of the name of another with intent to deceive; it does not include the signing of one's own name with or without authority, in any capacity, for any purpose.

(d) "Larceny and Embezzlement" as it applies to any named Insured means those acts as set forth in Section 37 of the Investment Company Act of 1940.

(e) "Items of Deposit" means any one or more checks and drafts. Items of Deposit shall not be deemed uncollectible until the Insured's collection procedures have failed.

SECTION 2. EXCLUSIONS

THIS BOND DOES NOT COVER:

(a) loss effected directly or indirectly by means of forgery or alteration of, on or in any instrument, except when covered by Insuring Agreement (A), (E), (F) or (G).

(b) loss due to riot or civil commotion outside the United States of America and Canada; or loss due to military, naval or usurped power,

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war or insurrection unless such loss occurs in transit in the circumstances recited in Insuring Agreement (D), and unless, when such transit was initiated, there was no knowledge of such riot, civil commotion, military, naval or usurped power, war or insurrection on the part of any person acting for the Insured in initiating such transit.

(c) loss, in time of peace or war, directly or indirectly caused by or resulting from the effects of nuclear fission or fusion or radioactivity; provided, however, that this paragraph shall not apply to loss resulting from industrial uses of nuclear energy.

(d) loss resulting from any wrongful act or acts of any person who is a member of the Board of Directors of the Insured or a member of any equivalent body by whatsoever name known unless such person is also an Employee or an elected official, partial owner or partner of the Insured in some other capacity, nor, in any event, loss resulting from the act or acts of any person while acting in the capacity of a member of such Board or equivalent body.

(e) loss resulting from the complete or partial non-payment of, or default upon, any loan or transaction in the nature of, or amounting to, a loan made by or obtained from the Insured or any of its partners, directors or Employees, whether authorized or unauthorized and whether procured in good faith or through trick, artifice, fraud or false pretenses. unless such loss is covered under Insuring Agreement (A), (E) or (F).

(f) loss resulting from any violation by the Insured or by any Employee

(1) of law regulating (a) the issuance, purchase or sale of securities, (b) securities transactions upon Security Exchanges or over the counter market, (c) Investment Companies, or (d) Investment Advisors, or

(2) of any rule or regulation made pursuant to any such law, unless such loss, in the absence of such laws, rules or regulations, would be covered under Insuring Agreements (A) or (E).

(g) loss of Property or loss of privileges through the misplacement or loss of Property as set forth in Insuring Agreement (C) or (D) while the Property is in the custody of any armored motor vehicle company, unless such loss shall be in excess of the amount recovered or received by the Insured under (a) the Insured's contract with said armored motor vehicle company, (b) insurance carried by said armored motor vehicle company for the benefit of users of its service, and (c) all other insurance and indemnity in force in whatsoever form carried by or for the benefit of users of said armored motor vehicle company's service, and then this bond shall cover only such excess.

(h) potential income, including but not limited to interest and dividends, not realized by the Insured because of a loss covered under this bond, except as included under Insuring Agreement (I).

(i) all damages of any type for which the Insured is legally liable, except direct compensatory damages arising from a loss covered under this bond.

(j) loss through the surrender of Property away from an office of the Insured as a result of a threat

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(1) to do bodily harm to any person, except loss of Property in transit in the custody of any person acting as messenger provided that when such transit was initiated there was no knowledge by the Insured of any such threat, or

(2) to do damage to the premises or Property of the Insured, except when covered under Insuring Agreement (A).

(k) all costs, fees and other expenses incurred by the Insured in establishing the existence of or amount of loss covered under this bond unless such indemnity is provided for under Insuring Agreement (B).

(l) loss resulting from payments made or withdrawals from the account of a customer of the Insured, shareholder or subscriber to shares involving funds erroneously credited to such account, unless such payments are made to or withdrawn by such depositor or representative of such person, who is within the premises of the drawee bank of the Insured or within the office of the Insured at the time of such payment or withdrawal or unless such payment is covered under Insuring Agreement (A).

(m) any loss resulting from Uncollectible Items of Deposit which are drawn from a financial institution outside the fifty states of the United States of America, District of Columbia, and territories and possessions of the United States of America, and Canada.

SECTION 3. ASSIGNMENT OF RIGHTS

This bond does not afford coverage in favor of any Employers of temporary personnel or of processors as set forth in sub-sections (6) and (7) of Section 1(a) of this bond, as aforesaid, and upon payment to the Insured by the Underwriter on account of any loss through dishonest or fraudulent act(s) including Larceny or Embezzlement committed by any of the partners, officers or employees of such Employers, whether acting alone or in collusion with others, an assignment of such of the Insured's rights and causes of action as it may have against such Employers by reason of such acts so committed shall, to the extent of such payment, be given by the Insured to the Underwriter, and the Insured shall execute all papers necessary to secure to the Underwriter the rights herein provided for.

SECTION 4. LOSS -NOTICE -PROOF-LEGAL PROCEEDINGS

This bond is for the use and benefit only of the Insured named in the Declarations and the Underwriter shall not be liable hereunder for loss sustained by anyone other than the Insured unless the Insured, in its sole discretion and at its option, shall include such loss in the Insured's proof of loss. At the earliest practicable moment after discovery of any loss hereunder the Insured shall give the Underwriter written notice thereof and shall also within six months after such discovery furnish to the Underwriter affirmative proof of loss with full particulars. If claim is made under this bond for loss of securities or shares, the Underwriter shall not be liable unless each of such securities or shares is identified in such proof of loss by a certificate or bond number or, where such securities or shares are uncertificated, by such identification means as agreed to by the Underwriter. The Underwriter shall have thirty days after notice and proof of loss within which to investigate the claim, but

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where the loss is clear and undisputed, settlement shall be made within forty-eight hours; and this shall apply notwithstanding the loss is made up wholly or in part of securities of which duplicates may be obtained. Legal proceedings for recovery of any loss hereunder shall not be brought prior to the expiration of sixty days after such proof of loss is filed with the Underwriter nor after the expiration of twenty-four months from the discovery of such loss, except that any action or proceeding to recover hereunder on account of any judgment against the Insured in any suit mentioned in General Agreement C or to recover attorneys' fees paid in any such suit, shall be begun within twenty-four months from the date upon which the judgment in such suit shall become final. If any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

Discovery occurs when the Insured

(a) becomes aware of facts, or

(b) receives written notice of an actual or potential claim by a third party which alleges that the Insured is liable under circumstance

which would cause a reasonable person to assume that a loss covered by the bond has been or will be incurred even though the exact amount or details of loss may not be then known.

SECTION 5. VALUATION OF PROPERTY

The value of any Property, except books of accounts or other records used by the Insured in the conduct of its business, for the loss of which a claim shall be made hereunder, shall be determined by the average market value of such Property on the business day next preceding the discovery of such loss; provided, however, that the value of any Property replaced by the Insured prior to the payment of claim therefor shall be the actual market value at the time of replacement; and further provided that in case of a loss or misplacement of interim certificates, warrants, rights, or other securities, the production which is necessary to the exercise of subscription, conversion, redemption or deposit privileges, the value thereof shall be the market value of such privileges immediately preceding the expiration thereof if said loss or misplacement is not discovered until after their expiration. If no market price is quoted for such Property or for such privileges, the value shall be fixed by agreement between the parties or by arbitration.

In case of any loss or damage to Property consisting of books of accounts or other records used by the Insured in the conduct of its business, the Underwriter shall be liable under this bond only if such books or records are actually reproduced and then for not more than the cost of blank books, blank pages or other materials plus the cost of labor for the actual transcription or copying of data which shall have been furnished by the Insured in order to reproduce such books and other records.

SECTION 6. VALUATION OF PREMISES AND FURNISHINGS

In case of damage to any office of the Insured, or loss of or damage to the furnishings, fixtures, stationery, supplies, equipment, safes or vaults therein, the Underwriter shall not be liable for more than the actual cash value thereof, or for more than the actual cost of their replacement or repair. The Underwriter may, at its election, pay such actual cash value or make such replacement or repair. If the Underwriter and the Insured cannot agree upon such cash value or such cost of replacement or repair, such shall be determined by arbitration.

SECTION 7. LOST SECURITIES

If the Insured shall sustain a loss of securities the total value of which is in excess of the limit stated in Item 3 of the Declarations of this bond, the liability of the Underwriter shall be limited to payment for, or duplication of, securities having value equal to the limit stated in Item 3 of the Declarations of this bond.

If the Underwriter shall make payment to the Insured for any loss of securities, the Insured shall thereupon assign to the Underwriter all of the Insured's rights, title and interests in and to said securities.

With respect to securities the value of which do not exceed the Deductible Amount (at the time of the discovery of the loss) and for which the Underwriter may at its sole discretion and option and at the request of the Insured issue a Lost Instrument Bond or Bonds to effect replacement thereof, the Insured will pay the usual premium charged therefor and will indemnify the Underwriter against all loss or expense that the Underwriter may sustain because of the issuance of such Lost Instrument Bond or Bonds.

With respect to securities the value of which exceeds the Deductible Amount (at the time of discovery of the loss) and for which the Underwriter may issue or arrange for the issuance of a Lost Instrument Bond or Bonds to effect replacement thereof, the Insured agrees that it will pay as premium therefor a proportion of the usual premium charged therefor, said proportion being equal to the percentage that the Deductible Amount bears to the value of the securities upon discovery of the loss, and that it will indemnify the issuer of said Lost Instrument Bond or Bonds against all loss and expense that is not recoverable from the Underwriter under the terms and conditions of this INVESTMENT COMPANY BLANKET BOND subject to the Limit of Liability hereunder.

SECTION 8. SALVAGE

In case of recovery, whether made by the Insured or by the Underwriter, on account of any loss in excess of the Limit of Liability hereunder plus the Deductible Amount applicable to such loss from any source other than suretyship, insurance, reinsurance, security or indemnity taken by or for the benefit of the Underwriter, the net amount of such recovery, less the actual costs and expenses of making same, shall be applied to reimburse the Insured in full for the excess portion of such loss, and the remainder, if any, shall be paid first in reimbursement of the Underwriter and thereafter in reimbursement of the Insured for that part of such loss within the Deductible Amount. The Insured shall execute all necessary papers to secure to the Underwriter the rights provided for herein.

SECTION 9. NON-REDUCTION AND NON-ACCUMULATION OF LIABILITY AND TOTAL LIABILITY

At all times prior to termination hereof this bond shall continue in force for the limit stated in the applicable sections of Item 3 of the Declarations of this bond notwithstanding any previous loss for which the Underwriter may have paid or be liable to pay hereunder; PROVIDED, however, that regardless of the number of years this bond shall continue in force and the number of premiums which shall be payable or paid, the liability of the Underwriter under this bond with respect to all loss resulting from

(a) any one act of burglary, robbery or holdup, or attempt thereat, in which no Partner or Employee is concerned or implicated shall be deemed to be one loss, or (b) any one unintentional or negligent act on the part of any one person resulting in damage to or destruction or misplacement of Property, shall be deemed to be one loss, or (c) all wrongful acts, other than those specified in (a) above, of any one person shall be deemed to be one loss, or

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(d) all wrongful acts, other than those specified in (a) above, of one or more persons (which dishonest act(s) or act(s) of Larceny or Embezzlement include, but are not limited to, the failure of an Employee to report such acts of others) whose dishonest act or acts intentionally or unintentionally, knowingly or unknowingly, directly or indirectly, aid or aids in any way, or permits the continuation of, the dishonest act or acts of any other person or persons shall be deemed to be one loss with the act or acts of the persons aided, or

(e) any one casualty or event other than those specified in (a), (b), (c) or (d) preceding, shall be deemed to be one loss, and

shall be limited to the applicable Limit of Liability stated in Item 3 of the Declarations of this bond irrespective of the total amount of such loss or losses and shall not be cumulative in amounts from year to year or from period to period.

Sub-section (c) is not applicable to any situation to which the language of subsection (d) applies.

SECTION 10. LIMIT OF LIABILITY

With respect to any loss set forth in the PROVIDED clause of Section 9 of this bond which is recoverable or recovered in whole or in part under any other bonds or policies issued by the Underwriter to the Insured or to any predecessor in interest of the Insured and terminated or cancelled or allowed to expire and in which the period for discovery has not expired at the time any such loss thereunder is discovered, the total liability of the Underwriter under this bond and under other bonds or policies shall not exceed, in the aggregate, the amount carried hereunder on such loss or the amount available to the Insured under such other bonds or policies, as limited by the terms and conditions thereof, for any such loss if the latter amount be the larger.

SECTION 11. OTHER INSURANCE

If the Insured shall hold, as indemnity against any loss covered hereunder, any valid and enforceable insurance or suretyship, the Underwriter shall be liable hereunder only for such amount of such loss which is in excess of the amount of such other insurance or suretyship, not exceeding, however, the Limit of Liability of this bond applicable to such loss.

SECTION 12. DEDUCTIBLE

The Underwriter shall not be liable under any of the Insuring Agreements of this bond on account of loss as specified, respectively, in sub-sections (a), (b), (c), (d) and (e) of Section 9, NON-REDUCTION AND NON-ACCUMULATION OF LIABILITY AND TOTAL LIABILITY, unless the amount of such loss, after deducting the net amount of all reimbursement and/or recovery obtained or made by the Insured, other than from any bond or policy of insurance issued by an insurance company and covering such loss, or by the Underwriter on account thereof prior to payment by the Underwriter of such loss, shall exceed the Deductible Amount set forth in Item 3 of the Declarations hereof (herein called Deductible Amount) and then for such excess only, but in no event for more than the applicable Limit of Liability stated in Item 3 of the Declarations.

The Insured will bear, in addition to the Deductible Amount, premiums on Lost Instrument Bonds as set forth in Section 7.

There shall be no deductible applicable to any loss under Insuring Agreement A sustained by any Investment Company named as Insured herein.

SECTION 13. TERMINATION

The Underwriter may terminate this bond as an entirety by furnishing written notice specifying the termination date which cannot be prior to 60 days after the receipt

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of such written notice by each Investment Company named as Insured and the Securities and Exchange Commission, Washington, D.C. The Insured may terminate this bond as an entirety by furnishing written notice to the Underwriter. When the Insured cancels, the Insured shall furnish written notice to the Securities and Exchange Commission, Washington. D.C. prior to 60 days before the effective date of the termination. The Underwriter shall notify all other Investment Companies named as Insured of the receipt of such termination notice and the termination cannot be effective prior to 60 days after receipt of written notice by all other Investment Companies. Premiums are earned until the termination date as set forth herein.

This Bond will terminate as to any one Insured immediately upon taking over of such Insured by a receiver or other liquidator or by State or Federal officials, or immediately upon the filing of a petition under any State or Federal statute relative to bankruptcy or reorganization of the Insured, or assignment for the benefit of creditors of the Insured. or immediately upon such Insured ceasing to exist, whether through merger into another entity, or by disposition of all of its assets.

The Underwriter shall refund the unearned premium computed at short rates in accordance with the standard short rate cancellation tables if terminated by the Insured or pro rata if terminated for any other reason.

This Bond shall terminate

(a) as to any Employee as soon as any partner, officer or supervisory Employee of the Insured, who is not in collusion with such Employee, shall learn of any dishonest or fraudulent act(s), including Larceny or Embezzlement on the part of such Employee without prejudice to the loss of any Property then in transit in the custody of such Employee (See Section 16[d]), or

(b) as to any Employee 60 days after receipt by each Insured and by the Securities and Exchange Commission of a written notice from the Underwriter of its desire to terminate this bond as to such Employee, or

(c) as to any person, who is a partner, officer or employee of any Electronic Data Processor covered under this bond, from and after the time that the Insured or any partner or officer thereof not in collusion with such person shall have knowledge or information that such person has committed any dishonest or fraudulent act(s), including Larceny or Embezzlement in the service of the Insured or otherwise, whether such act be committed before or after the time this bond is effective.

SECTION 14. RIGHTS AFTER TERMINATION OR CANCELLATION

At any time prior to the termination or cancellation of this bond as an entirety, whether by the Insured or the Underwriter, the Insured may give to the Underwriter notice that it desires under this bond an additional period of 12 months within which to discover loss sustained by the Insured prior to the effective date of such termination or cancellation and shall pay an additional premium therefor.

Upon receipt of such notice from the Insured, the Underwriter shall give its written consent thereto; provided, however, that such additional period of time shall terminate immediately;

(a) on the effective date of any other insurance obtained by the Insured, its successor in business or any other party, replacing in whole or in part the insurance afforded by this bond, whether or not such other insurance provides

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coverage for loss sustained prior to its effective date, or

(b) upon takeover of the Insured's business by any State or Federal official or agency, or by any receiver or liquidator, acting or appointed for this purpose

without the necessity of the Underwriter giving notice of such termination. In the event that such additional period of time is terminated, as provided above, the Underwriter shall refund any unearned premium.

The right to purchase such additional period for the discovery of loss may not be exercised by any State or Federal official or agency, or by any receiver or liquidator, acting or appointed to take over the Insured's business for the operation or for the liquidation thereof or for any other purpose.

SECTION 15. CENTRAL HANDLING OF SECURITIES

Securities included in the systems for the central handling of securities established and maintained by Depository Trust Company, Midwest Depository Trust Company, Pacific Securities Depository Trust Company, and Philadelphia Depository Trust Company, hereinafter called Corporations, to the extent of the Insured's interest therein as effective by the making of appropriate entries on the books and records of such Corporations shall be deemed to be Property.

The words "Employee" and "Employees" shall be deemed to include the officers, partners, clerks and other employees of the New York Stock Exchange, Boston Stock Exchange, Midwest Stock Exchange, Pacific Stock Exchange and Philadelphia Stock Exchange, hereinafter called Exchanges, and of the above named Corporations, and of any nominee in whose name is registered any security included within the systems for the central handling of securities established and maintained by such Corporations, and any employee of any recognized service company, while such officers, partners, clerks and other employees and employees of service companies perform services for such Corporations in the operation of such systems. For the purpose of the above definition a recognized service company shall be any company providing clerks or other personnel to said Exchanges or Corporation on a contract basis.

The Underwriter shall not be liable on account of any loss(es) in connection with the central handling of securities within the systems established and maintained by such Corporations, unless such loss(es) shall be in excess of the amount(s) recoverable or recovered under any bond or policy of insurance indemnifying such Corporations, against such loss(es), and then the Underwriter shall be liable hereunder only for the Insured's share of such excess loss(es), but in no event for more than the Limit of Liability applicable hereunder.

For the purpose of determining the Insured's share of excess loss(es) it shall be deemed that the Insured has an interest in any certificate representing any security included within such systems equivalent to the interest the Insured then has in all certificates representing the same security included within such systems and that such Corporations shall use their best judgement in apportioning the amount(s) recoverable or recovered under any bond or policy of insurance indemnifying such Corporations against such loss(es) in connection with the central handling of securities within such systems among all those having an interest as recorded by appropriate entries in the books and records of such Corporations in Property involved in such loss(es) on the basis that each such interest shall share in the amount(s) so recoverable or recovered in the ratio that the value of each such interest bears to the total value of all such interests and that the Insured's share of such excess loss(es) shall be the amount of the Insured's interest in such Property in excess of the amount(s) so apportioned to the Insured by such Corporations.

This bond does not afford coverage in favor of such Corporations or Exchanges or any nominee in whose name is registered any security included within the systems for the central handling of securities established and maintained by such Corporations, and upon payment to the Insured by the Underwriter on account of any loss(es) within the systems, an assignment of such of the Insured's rights and causes of action as it may have against such Corporations or Exchanges shall to the extent of such payment, be given by the Insured to the Underwriter, and the Insured shall execute all papers necessary to secure to the Underwriter the rights provided for herein.

SECTION 16. ADDITIONAL COMPANIES INCLUDED AS INSURED

If more than one corporation, co-partnership or person or any combination of them be included as the Insured herein:

(a) the total liability of the Underwriter hereunder for loss or losses sustained by any one or more or all of them shall not exceed the limit for which the Underwriter would be liable hereunder if all such loss were sustained by any one of them,

(b) the one first named herein shall be deemed authorized to make, adjust and receive and enforce payment of all claims hereunder and shall be deemed to be the agent of the others for such purposes and for the giving or receiving of any notice required or permitted to be given by the terms hereof, provided that the Underwriter shall furnish each named Investment Company with a copy of the bond and with any amendment thereto, together with a copy of each formal filing of the settlement of each such claim prior to the execution of such settlement,

(c) the Underwriter shall not be responsible for the proper application of any payment made hereunder to said first named Insured,

(d) knowledge possessed or discovery made by any partner, officer or supervisory Employee of any Insured shall for the purposes of Section 4 and Section 13 of this bond constitute knowledge or discovery by all the Insured, and

(e) if the first named Insured ceases for any reason to be covered under this bond, then the Insured next named shall thereafter be considered as the first named Insured for the purposes of this bond.

SECTION 17. NOTICE AND CHANGE OF CONTROL

Upon the Insured's obtaining knowledge of a transfer of its outstanding voting securities which results in a change in control (as set forth in Section 2(a) (9) of the Investment Company Act of 1940) of the Insured, the Insured shall within thirty (30) days of such knowledge give written notice to the Underwriter setting forth:

(a) the names of the transferors and transferees (or the names of the beneficial owners if the voting securities are requested in another name), and

(b) the total number of voting securities owned by the transferors and the transferees (or the beneficial owners), both immediately before and after the transfer, and

(c) the total number of outstanding voting securities.

As used in this section, control means the power to exercise a controlling influence over the management or policies of the Insured.

Failure to give the required notice shall result in termination of coverage of this bond, effective upon the date of stock transfer for any loss in which any transferee is concerned or implicated.

Such notice is not required to be given in the case of an Insured which is an Investment Company.

SECTION 18. CHANGE OR MODIFICATION

This bond or any instrument amending or effecting same may not be changed or modified orally. No changes in or modification thereof shall be effective unless made by written endorsement issued to form a part hereof over the signature of the Underwriter's Authorized Representative. When a bond covers only one Investment Company no change or modification which would adversely affect the rights of the Investment Company shall be effective prior to 60 days after written notification has been furnished to the Securities and Exchange Commission, Washington, D.C. by the Insured or by the Underwriter. If more than one Investment Company is named as the Insured herein, the Underwriter shall give written notice to each Investment Company and to the Securities and Exchange Commission, Washington, D.C. not less than 60 days prior to the effective date of any change or modification which would adversely affect the rights of such Investment Company.

IN WITNESS WHEREOF, the Underwriter has caused this bond to be executed on the Declarations Page.

41206 (9/84) 16 **COPY**

RIDER #1

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

COVERAGE TERRITORY ENDORSEMENT

Payment of loss under this policy shall only be made in full compliance with all United States of America economic or trade sanction laws or regulations, including, but not limited to, sanctions, laws and regulations administered and enforced by the U.S. Treasury Department's Office of Foreign Assets Control ("OFAC").

RIDER #2

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of
policy number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

NAMED INSURED

1. The Name of Insured shown in Item 1. of the Declarations is amended to read as follows:

The George Putnam Fund of Boston
Putnam Fund for Growth & Income
Putnam Investors Fund
Putnam Income Fund
Putnam Global Equity Fund
Putnam Vista Fund
Putnam Voyager Fund
Putnam Convertible Income-Growth
Putnam Money Market Fund
Putnam Tax Exempt Income Fund
Putnam Equity Income Fund
Putnam High Yield Trust
Putnam VT Global Equity Fund
Putnam Global Natural Resources
Putnam New Jersey Tax Exempt Inc
Putnam Health Sciences Trust
Putnam OTC & Emerging Growth Fund
Putnam California Tax Exempt
Putnam New York Tax Exempt
Putnam U.S. Govt. Income Trust
Putnam American Govt. Income Fund
Putnam Amt-Free Ins Muni Fund
Putnam Tax Free High Yield
Putnam Florida Tax Exempt Income
Putnam Global Income Trust
Putnam Pennsylvania Tax Exempt
Putnam Managed Muni Income Trust
Putnam High Yield Municipal Trust
Putnam Europe Equity Fund
Putnam Invest Grade Muni Inc Trust
Putnam High Yield Advantage Fund
Putnam High Income Securities Fund

RIDER #2 (Continued)

Putnam Tax Exempt Money Market
Putnam VT Voyager Fund
Putnam VT Growth & Income Fund
Putnam VT High Yield Fund
Putnam VT Income Fund
Putnam VT Money Market Fund
VT Global Asset Allocation Fund
Putnam Premier Income Trust
Putnam Master Intermediate Trust
Putnam Diversified Income Trust
Putnam VT New Opportunities Fund
VT Utilities Growth & Income Fund

Putnam Tax Free Health Care
Municipal Bond Fund
Putnam Cal Invest Grade Muni Trust
Putnam NY Invest Grade Muni Trust
Putnam Asset Alloc Growth Port
Putnam Asset Alloc Balanced Port
Putnam Asset Alloc Conserve Port
Putnam New Value Fund
Putnam Discovery Growth Fund
Putnam Ltd Duration Govt Inc Fund
Putnam Capital Appreciation
Putnam Intl New Opportunities
Putnam Muni Opportunities Trust
Putnam Inv Grade Muni Tr II Pfd
Putnam Utilities Growth & Income
Putnam International Equity
Putnam Mass Tax Exempt
Putnam Michigan Tax Exempt
Putnam Minnesota Tax Exempt
Putnam Ohio Tax Exempt
Putnam New Opportunities Fund
Putnam Arizona Tax Exempt Income
Putnam Managed Preferred
Putnam Invest Grade Muni-Preferred
Putnam Cal Inv Grade Muni Tr Pfd
Putnam Muni Opport Tr Prefer
Putnam High Yield Muni-Preferred
Putnam NY Inv Grade Muni Tr Pfd
The Classic Equity Fund
Putnam VT Diversified Income Fund
VT Mid Cap Value
VT Capital Opportunities

RIDER #2 (Continued)

Putnam VT Equity Income
Prime Money Market Fund
Floating Rate Income Fund
Putnam Growth Opportunities Fund
Putnam Research Fund
Putnam International Capital Opp
Putnam Internatl Growth & Income
VT Internatl Growth & Income Fund
VT International Equity
VT Internatl New Opportunities
Putnam VT Vista Fund
Putnam VT New Value
Putnam Small Cap Growth
Putnam Capital Opportunities
Putnam VT Investors Fund

Pvt OTC & Emerg Growth Fund
Putnam VT George Putnam Fund
Putnam VT Health Sciences Fund
Putnam VT Research Fund
Putnam Small Cap Value Fund
Putnam Tax Smart Equity Fund
Putnam VT Small Cap Value Fund
Putnam Mid-Cap Value Fund
Putnam VT Growth Opps Fund
Putnam VT Am Govt Income Fund
VT Discovery Growth
Putnam VT Capital Appreciatio
Emerging Opportunities THLee
Putnam Income Strategies Fund
Putnam Municipal Money Market Fund

Putnam Retirement Ready Funds

Retirement Ready 2040
Retirement Ready 2045
Retirement Ready 2010
Retirement Ready Maturity
Retirement Ready 2015
Retirement Ready 2020
Retirement Ready 2025
Retirement Ready 2030
Retirement Ready 2035
Retirement Ready 2050

RIDER #2 (Continued)

2. Subject to General Agreement A., any newly created, acquired or sponsored Investment Company, fund or trust of Putnam Acquisition Financing Inc., its subsidiaries or affiliated entities, newly created, acquired or sponsored after the effective date of this bond but prior to termination or cancellation of this bond with assets of less than $500,000,000 will be automatically included as an Insured without any additional premium. Any newly created, acquired or sponsored Investment Company, fund or trust of Putnam Acquisition Financing Inc., its subsidiaries or affiliated entities, newly created, acquired or sponsored after the effective date of this bond but prior to termination or cancellation of this bond with assets of $500,000,000 or more will need to comply with the reporting requirements and may be subject to payment of an additional premium.

3. Each of the following entities, with respect to its service to the Mutual Fund Named Insureds, shall be deemed Named Insured under the Bond:

Putnam Investment Management, LLC
Putnam Acquisition Financing Inc.
Putnam Fiduciary Trust Company
Putnam Retail Management Limited Partnership
Putnam U.S. Holdings Inc.
TH Lee, Putnam Capital Management, LLC

4. Nothing hereing contained shall be held to vary, alter, waive or extend any of terms, limitations, conditions or agreements of the attached bond other than as above stated.

RIDER **#3**

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**
by **National Union Fire Insurance Company of Pittsburgh, Pa.**

COMPUTER SYSTEMS

It is agreed that:

1. The attached bond is amended by adding an Insuring Agreement (J) as follows:

COMPUTER SYSTEMS

Loss resulting directly from a fraudulent

(1) entry of data into, or

(2) change of data or programs within

a Computer System; provided the fraudulent entry or change causes

(a) Property to be transferred, paid or delivered;

(b) an account of the Insured, or of its customer, to be added, deleted, debited or credited;

(c) an unauthorized account or a fictitious account to be debited or credited.

SCHEDULE OF SYSTEMS

All computer systems utilized by the Insured.

2. As used in this Insuring Agreement, Computer System means:

(a) computers with related peripheral equipment, including storage components, wherever located; \

(b) systems and application software;

(c) terminal devices;

(d) related communication networks or customer communication systems including the Internet; and

(e) related electronic fundstransfer systems;

by which data are electronically collected, transmitted, processed, stored and retrieved.

RIDER #3 (Continued)

3. In addition to the Exclusions in the attached Bond, the following exclusions are applicable to this Insuring Agreement:

(a) loss resulting directly or indirectly from the theft of confidential information, material or data except to the extent that such confidential information, material or data is used to support or facilitate the commission of an act covered by the Computer Systems Insuring Agreement; and

(b) loss resulting directly or indirectly from entries or changes made by an individual authorized to have access to a Computer System who acts in good faith on instructions, unless such instructions are given to that individual by a software contractor (or by a partner, officer or employee thereof) authorized by the Insured to design, develop, prepare, supply, service, write or implement programs for the Insured's Computer System.

4. The coverage afforded by this Insuring Agreement applies only to loss discovered by the Insured during the period this Insuring Agreement is in force.

5. All loss or series of losses involving the fraudulent activity of one individual, or involving fraudulent activity in which one individual is implicated, whether or not that individual is specifically identified, shall be treated as one loss. A series of losses involving unidentified individuals but arising from the same method of operation may be deemed by the Underwriter to involve the same individual and, in that event, shall be treated as one loss.

6. If any loss is covered under this Insuring Agreement and any other Insuring Agreement or Coverage, the maximum amount payable for such loss shall not exceed the largest amount available under any one Insuring Agreement or Coverage.

7. Coverage under this Insuring Agreement shall terminate upon termination or cancellation of the bond to which this Insuring Agreement is attached. Coverage under this Insuring Agreement may also be terminated or cancelled without cancelling the Bond as an entirety:

(a) 60 days after receipt by the Insured of written notice from the Underwriter of its desire to terminate or cancel coverage under this Insuring Agreement; or

(b) immediately upon receipt by the Underwriter of a written request from the Insured to terminate or cancel coverage under this Insuring Agreement.

RIDER #3 (Continued)

The Underwriter shall refund to the Insured the unearned premium for this coverage under this Insuring Agreement. The refund shall be computed at short rates if this Insuring Agreement is terminated or cancelled or reduced by notice from, or at the instance of, the Insured.

8. Notwithstanding the foregoing, however, coverage afforded by this Insuring Agreement is not designed to provide protection against loss covered under a separate Electronic and Computer Crime Policy by whatever title assigned or by whatever Underwriter written. Any loss which is covered under such separate policy is excluded from coverage under this Bond and the Insured agrees to make claim for such loss under its separate policy.

9. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations, conditions or agreements of the attached bond other than as above stated.

RIDER #4

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

It is agreed that:

1. The attached bond is amended by adding an additional Insuring Agreement (K) as follows:

VOICE INITIATED FUNDS TRANSFERS

Loss resulting directly from the Insured having, in good faith, transferred funds from a Customers account through an electronic funds transfer system covered in the Computer Systems Insuring Agreement attached to this bond, in reliance upon a Voice Initiated Funds Transfer Instruction which was purported to be from an officer, director, partner or employee of a Customer of the Insured who was authorized and appointed by such Customer to instruct the Insured by means of voice message transmitted by telephone to make certain funds transfers, and which instruction

1. was in fact, from an imposter, or a person not authorized by the Customer to issue such instructions by voice message transmitted by telephone, and which

2. was received by an Employee of the Insured specifically designated to receive and act upon such instructions; but provided that

a. such voice instruction was electronically recorded by the Insured and proper password(s) or code word(s) given; and

b. if the transfer was in excess of **$150,000** the voice instruction was verified by a direct call back to an employee of the Customer (or a person thought by the Insured to be an employee of the Customer)

2. As used in this Insuring Agreement, Customer means an entity or individual which has a written agreement with the Insured for Customer Voice Initiated Electronic Funds Transfer and has provided the Insured with the names of its officers, directors, partners or employees authorized to initiate such Transfers.

RIDER #4 (Continued)

3. Proof of loss for claim under the Voice Initiated Electronic Funds Transfer Insuring Agreement must include electronic recordings of such voice instructions and the verification call back, if such call was required.

4. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations, conditions or agreements of the attached bond other than as above stated.

RIDER #5

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**

issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

TELEFACSIMILE TRANSFER FRAUD

It is agreed that:

1. The attached bond is amended by adding an additional Insuring Agreement (L) as follows:

TELEFACSIMILE TRANSFER FRAUD

Loss resulting by reason of the Insured having transferred, paid or delivered any funds or Property, established any credit, debited any account, or given any value relying on any fraudulent instructions sent by a customer or financial institution by Telefacsimile Transmission directed to the Insured, authorizing or acknowledging the transfer, payment, or delivery of funds or property, the establishment of a credit, debiting of any account, or the giving of value by the Insured, but only if such telefacsimile instructions:

i) bear a valid test key exchanged between the Insured and a customer or another financial institution with authority to use such test key for Telefacsimile instructions in the ordinary course of business, but which test key has been wrongfully obtained by a person who was not authorized to initiate, make, validate or authenticate a test key arrangement; and

ii) fraudulently purport to have been sent by such customer or financial institution, but which telefacsimile instruction were transmitted without the knowledge or consent of such customer or financial institution by a person other than such customer or financial institution and which bear a forged signature.

"Telefacsimile" means a system of transmitting written documents by electronic signals over telephone lines to equipment maintained by the Insured within its communication room for the purposes of reproducing a copy of said document. It does not mean electronic communication sent by Telex, TWC, or electronic mail, or Automated Clearing House.

RIDER #5 (Continued)

2. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations conditions or agreements of the attached bond other than as above stated.

RIDER #6

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

AUTOMATED PHONE SYSTEM

It is agreed that:

1. The attached bond is amended by adding an additional Insuring Agreement (M) as follows:

AUTOMATED PHONE SYSTEM

1. Loss caused by an Automated Phone System ("APS") Transaction, where the request for such APS Transaction is unauthorized or fraudulent and is made with the intent to deceive; provided, that the entity which receives such request generally maintains and follows during the Bond Period all APS Designated Procedures with respect to APS Transactions. The unintentional isolated failure of such entity to maintain and follow a particular APS Designated Procedure in a particular instance shall not preclude coverage under this Insuring Agreement, subject to the exclusions herein and in the Bond.

1. <u>Definitions</u>. The following terms used in this Insuring Agreement shall have the following meanings:

a. "APS Transaction" means any APS Redemption, APS Exchange, APS Purchase or APS Election.

b. "APS Redemption" means any redemption of shares issued by an Investment Company which is requested over the telephone by means of information transmitted by an individual caller through use of a telephone keypad.

c. "APS Election" means any election concerning various account features available to Fund Shareholders which is made over the telephone by means of information transmitted by an individual caller through use of a telephone keypad. These features include account statements, auto exchange, auto asset builder, automatic withdrawal, dividends/capital gains options, dividend sweep, telephone balance consent and change of address.

<u>RIDER</u> #6 (Continued)

d. "APS Exchange" means any exchange of shares in a registered account of one **f**und into shares in an identically registered account of another **f**und in the same complex pursuant to exchange privileges of the two **f**unds, which exchange is requested over the telephone by means of information transmitted by an individual caller through use of a telephone keypad.

e. "APS Designated Procedures" means all of the following procedures:

(1) <u>Election in Application</u>: No APS Redemption shall be executed unless the shareholder to whose account such an APS Redemption relates has previously elected by **o**fficial **d**esignation to permit such APS Redemption.

(2) <u>Logging</u>: All APS Transaction requests shall be logged or otherwise recorded, so as to preserve all of the information transmitted by an individual caller through use of a telephone keypad in the course of such a request, and the records shall be retained for at least six months.

(a) Information contained in the records shall be capable of being retrieved and produced within a reasonable time after retrieval of specific information is requested, at a success rate of no less than 85 percent.

(3) <u>Identity Test</u>: The identity of the caller in any request for an APS Transaction shall be tested before execution of that APS Transaction by requiring the entry by the caller of a confidential personal identification number ("PIN")

(a) Limited **a**ttempts to **e**nter PIN: If the caller fails to enter a correct PIN within three attempts, the caller must not be allowed additional attempts during the same telephone call to enter the PIN

(4) <u>Written Confirmation</u>: A written confirmation of any APS Transaction shall be mailed to the shareholder(s) to whose account such APS Transaction relates, at the original record address, by the end of the Insured's next regular

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processing cycle, but in no event later than five business days following such APS Transaction.

RIDER #6 (Continued)

(5) Access to APS Equipment: Access to the equipment which permits the entity receiving the APS Transaction request to process and effect the transaction shall be limited in the following manner: The Share Holder Services Group, Inc.

f. APS Purchase means any purchase of shares issued by an Investment Company, which is requested over the telephone by means of information transmitted by an individual caller through the use of a telephone keypad.

2. Exclusions. It is further understood and agreed that this extension shall not cover:

a. **a**ny loss covered under Insuring Agreement (A), Fidelity, of this Bond;

b. any loss resulting from:

(1) the redemption of shares, where the proceeds of such redemption are made payable to other than

(i) the shareholder of record**;** or

(ii) a person officially designated to receive redemption proceeds**;** or

(iii) a bank account officially designated to receive redemption proceeds**;** or

(2) the redemption of shares, where the proceeds of such redemption are paid by check mailed to any address, unless such address has either been

(i) designated by voice over the telephone or in writing without a signature guarantee, in either case at least thirty (30) days prior to such redemption**;** or

(ii) officially designated**;** or

(iii) verified by any other procedures which may be stated below in this Insuring Agreement**;** or

(3) **t**he redemption of shares, where the proceeds of such redemption are paid by wire transfer to other than the shareholders officially designated bank account**;** or

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RIDER #6 (Continued)

(4) the **i**ntentional failure to adhere to one or more APS Designated Procedures.

2. Nothing herein contained shall be held to vary, alter, waive, or extend any of the terms, limitations, conditions or agreements of the attached bond other than as above stated.

RIDER #7

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of

policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

UNAUTHORIZED SIGNATURES

It is agreed that:

1. The attached bond is amended by adding an Insuring Agreement (N) as follows:

UNAUTHORIZED SIGNATURES

Loss resulting directly from the Insured having accepted, paid or cashed any check or withdrawal order made or drawn on a customer's account which bears the signature or endorsement of one other than a person whose name and signature is on file with the Insured as an authorized signatory on such account. It shall be a condition precedent to the Insured's right of recovery under this Insuring Agreement that the Insured shall have on file signatures of all persons who are authorized signatories on such account.

2. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations, conditions or agreements of the attached bond other than as above stated.

RIDER #8

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of
policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

CLAIMS EXPENSE

It is agreed that:

1. The attached bond is amended by adding an Insuring Agreement (O) as follows:

CLAIMS EXPENSE

Reasonable expenses necessarily incurred and paid by the Insured in preparing any valid claim for loss under any of the Insuring Agreements of this Bond, which loss exceeds the Single Loss Deductible Amount of $150,000. The Underwriter's limit of liability for such expenses paid by the Insured in preparing any one such claim is as shown on the Declaration Page of this Bond.

For the purposes of this Insuring Agreement, Exclusion (k) is amended by deleting the period at the end of this Exclusion and adding the following words; "or Insuring Agreement (O)."

2. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations, conditions or agreements of the attached bond other than as above stated.

RIDER #9

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

1. It is agreed that the following Insuring Agreement (P) is added to the bond:

DESTRUCTION OF DATA OR PROGRAMS BY HACKER

Loss resulting directly from the malicious destruction of, or damage to, Electronic Data or Computer Programs owned by the Insured or for which the Insured is legally liable while stored within a Computer System covered under the terms of the Computer Systems Insuring Agreement attached to this bond.

The liability of the Underwriter shall be limited to the cost of duplication of such Electronic Data or Computer Programs from other Electronic Data or Computer Programs which shall have been furnished by the Insured.

In the event, however, that destroyed or damaged Computer Programs cannot be duplicated from other Computer Programs, the Company will pay the cost incurred for computer time, computer programmers, consultants or other technical specialists as is reasonably necessary to restore the Computer Programs to substantially the previous level of operational capability.

2. The following Definitions are added: Computer Systems (as defined in Computer Systems Insuring Agreement (J)) and Computer Programs and Electronic Data (as defined in Fidelity Insuring Agreement (A)).

3. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations, conditions or agreements or the attached bond other than as above stated.

RIDER #10

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

1. It is agreed that the following Insuring Agreement (Q) is added to the bond:

DESTRUCTION OF DATA OR PROGRAMS BY VIRUS

Loss resulting directly from the malicious destruction of, or damage to, Electronic Data or Computer Programs owned by the Insured or for which the Insured is legally liable while stored within a Computer System covered under the terms of the Computer Systems rider attached to this bond if such destruction or damage was caused by a computer program or similar instruction which was written or altered to incorporate a hidden instruction designed to destroy or damage Electronic Data or Computer Programs in the Computer System in which the computer program or instruction so written or so altered is used.

The liability of the Underwriter shall be limited to the cost of duplication of such Electronic Data or Computer Programs from other Electronic Data or Computer Programs which shall have been furnished by the Insured.

In the event, however, that destroyed or damaged Computer Programs cannot be duplicated from other Computer Programs, the Company will pay the cost incurred for computer time, computer programmers, consultants or other technical specialists as is reasonably necessary to restore the Computer Programs to substantially the previous level of operational capability.

Special Condition

Under this Insuring Agreement, "Single Loss" means all covered costs incurred by the Insured between the time destruction or damage is discovered and the time the Computer System is restored to substantially the previous level of operational capability. Recurrence of destruction or damage after the Computer System is restored shall constitute a separate "Single Loss."

RIDER #10 (Continued)

2. The following Definitions are added: Computer Systems (as defined in Computer Systems Insuring Agreement (J)) and Computer Programs and Electronic Data (as defined in Fidelity Insuring Agreement (A)).

3. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations, conditions or agreements of the attached bond other than as above stated.

RIDER #11

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

It is agreed that:

1. Insuring Agreement (A), Fidelity, is hereby deleted in its entirety and replaced by the following:

(A) Loss resulting directly from dishonest or fraudulent act(s), including Larceny or Embezzlement committed by an Employee, committed anywhere and whether committed alone or in collusion with others including loss of Property resulting from such acts of an Employee, which Property is held by the Insured for any purpose or in any capacity and whether so held gratuitously or not and whether or not the Insured is liable therefore.

Dishonest or fraudulent act(s) as used in this Insuring Agreement shall mean only dishonest or fraudulent act(s) committed by such Employee with the intent:

(a) to cause the Insured to sustain such loss; or

(b) to obtain financial benefit for the Employee, or for any other person or organization intended by the Employee to receive such benefit.

Notwithstanding the foregoing, however, it is agreed that with regard to Loans and/or Trading, this bond covers only loss resulting directly from dishonest or fraudulent acts committed by an Employee with the intent to cause the Insured to sustain such loss and which results in a financial benefit for the Employee; or results in an improper financial benefit for another person or entity with whom the Employee committing the dishonest or fraudulent act was in collusion, provided the Insured establishes that the Employee intended to participate in the financial benefit.

The word "Loan" as used in this Insuring Agreement means all extensions of credit by the Insured and all transactions creating a creditor relationship in favor of the Insured and all transactions by which the Insured assumes an existing creditor relationship.

<u>RIDER</u> #11 (Continued)

The word "Trading" as used in this Insuring Agreement means trading or dealings in securities, commodities, futures, options, foreign or Federal Funds, currencies, foreign exchange or the like.

As used in this Insuring Agreement, financial benefit does not include any salaries, commissions, fees, bonuses, promotions, awards, profit sharing, pensions, or other employee benefits earned in the normal course of employment.

Loss resulting directly from the malicious destruction of or the malicious damage of Computer Programs, Electronic Data or Electronic Data Processing Media committed by an Employee, whether committed alone or in collusion with others.

The liability of the Insurer shall be limited to the cost of duplication of such Computer Programs, Electronic Data or Electronic Data Processing Media from other Computer Programs, Electronic Data or Electronic Data Processing Media which shall have been furnished by the Insured.

In the event, however, that destroyed or damaged Computer Programs, Electronic Data or Electronic Data Processing Media cannot be duplicated from other Computer Programs, Electronic Data or Electronic Data Processing Media, the Insurer will pay the cost incurred for computer time, computer programmers, consultants or other technical specialists as is reasonably necessary to restore the Computer Programs, Electronic Data or Electronic Data Processing Media to substantially the previous level of operational capability.

As used in this Insuring Agreement, "Computer Program" means a set of related electronic instructions which direct the operations and functions of a computer or devices connected to it which enable the computer or devices to receive, process, store or send Electronic Data.

As used in this Insuring Agreement, "Electronic Data" means facts or information converted to a form usable in a Computer System by Computer Programs and which is stored on magnetic tapes or disks, or optical storage disks or other bulk media.

As used in this Insuring Agreement, "Electronic Data Processing Media" means the magnetic tapes or disks, or optical storage disks or other bulk media on which Electronic Data is stored.

<u>RIDER</u> #11 (Continued)

2. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, conditions, provisions, agreements or limitations of this bond other than as stated herein.

RIDER #12

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

AMENDED FORGERY OR ALTERATION

It is agreed that:

1. Insuring Agreement (E), Forgery or Alteration, first paragraph, is deleted in its entirety and replaced with the following:

Loss through Forgery or Alteration of, on or in any bills of exchange, checks, drafts, acceptances, certificates of deposit, promissory notes, or other written promises, orders or directions to pay sums certain in money, due bills, money orders, warrants, orders upon public treasuries, letters of credit, written instructions, advices or applications directed to the Insured, authorizing or acknowledging the transfer, payment, delivery or receipt of funds or Property, which instructions or advices or applications purport to have been signed or endorsed by any customer of the Insured, shareholder or subscriber to shares, whether certificated or uncertificated, of any Investment Company or by any financial or banking institution or stockbroker or Employee but which instructions, advices or applications either bear a forged signature or endorsement or have been altered without the knowledge and consent of such customer, shareholder or subscriber to shares, whether certificated or uncertificated, of an Investment Company, financial or banking institution or stockbroker or Employee, withdrawal orders or receipts or certificates of deposit for Property and bearing the name of the Insured as issuer, or of another Investment Company for which the Insured acts as agent, excluding, however, any loss covered under Insuring Agreement (F) hereof whether or not coverage for Insuring Agreement (F) is provided for in the Declarations of this bond.

2. Nothing herein contained shall be held to vary, alter, waive, or extend any of the terms, limitations, conditions, or provisions of the attached bond other than as above stated.

RIDER #13

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

AMENDED COUNTERFEIT CURRENCY

It is agreed that:

1. Insuring Agreement (G), Counterfeit Currency, is deleted in its entirety and the following is substituted therefore:

Loss resulting directly from the receipt by the Insured, in good faith, of any Counterfeit Money, coin or currency of the United States of America, Canada or any other country.

Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations, conditions or agreements of the attached bond other than as above stated.

RIDER #14

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

It is agreed that:

1. Insuring Agreement (D) IN TRANSIT is amended by deleting the words any person or persons acting as messenger, except while in the mail or with a carrier for hire, other than an armored motor vehicle company, for the purpose of transportation and replacing them with the words any person or persons acting as messenger or carrier for hire, for the purpose of transportation, except while in the mail.

2. RIDER # 4, VOICE INITIATED FUNDS TRANSFERS, is amended by deleting sections 1. 2. a. and b. in their entirety and substituting the following as section 1. 2. a.:

1. 2. a. the instruction must be received and processed in accordance with the Insureds established procedures for Voice Initiated Funds Transfers. If through an inadvertent error or omission, the transfer is not in compliance with the Insureds established procedures, such transfer shall nevertheless be covered hereunder.

3. RIDER # 5, TELEFACSIMILE TRANSFER FRAUD, is amended by deleting paragraph 1. i) in its entirety and substituting the following:

i) were received and processed in accordance with the Insureds established procedures for Telefacsimile transfers. If through an inadvertent error or omission, the transfer is not in compliance with the Insureds established procedures, such transfer shall nevertheless be covered hereunder.

4. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations, conditions or agreements of the attached bond other than as above stated.

AUTHORIZED REPRESENTATIVE

RIDER #15

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

It is agreed that:

1. Insuring Agreement (F), Securities, is amended by inserting, in paragraph (2), before the word **EXCLUDING,** the following language; or purportedly guaranteed in writing or witnessed any signature upon any transfer, assignment, bill of sale, power of attorney, guarantee, endorsement or other obligations upon or in connection with any securities, documents or other written instruments and which pass, or purport to pass, title to such securities, documents or other written instruments which purported guarantee was effected by the unauthorized use of a stamp or medallion of or belonging to the Insured which was lost, stolen or counterfeited and for which loss the Insured is legally liable.

2. Exclusion (f)(2) is amended by deleting the words would be covered under Insuring Agreements (A) or (E) and substituting the words would be covered under Insuring Agreements (A), (E) or (F).

3. Exclusion (m) is deleted in its entirety.

4. Conditions and Limitations, Section 15., Central Handling of Securities, is amended by deleting the first paragraph in its entirety and substituting the following language:

Securities included in the systems for the central handling of securities established and maintained by any depository used by the Insured, hereinafter called Corporations, to the extent of the Insureds interest therein as effective by the making of appropriate entries on the books and records of such Corporations shall be deemed to be Property.

RIDER #15 (Continued)

5. Conditions and Limitations, Section 16., Additional Companies Included as Insured, is amended, in paragraph (d), by deleting the words any partner, officer or supervisory Employee of any Insured and substituting the words the Chief Compliance Officer, General Counsel or Treasurer of Putnam Acquisition Financing Inc. (or the equivalent position if no Chief Compliance Officer, General Counsel or Treasurer exists).

ALL OTHER TERMS, CONDITIONS AND EXCLUSIONS REMAIN UNCHANGED.

RIDER #16

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

NOTICE AND CHANGE IN CONTROL/TERMINATION AMENDATORY
(Waiver For Specific Transaction(s))

It consideration of the premium charged, it is hereby understood and agreed that, as of the effective time of the Putnam Investments Acquisition (as that term is defined below), the bond is hereby amended as follows:

1. Section 13. and Section 17. shall not apply to the following event(s):

The acquisition of Putnam Investments Trust by Great-West Lifeco Inc., (the Putnam Investments Acquisition) a subsidiary of Power Financial Corporation, pursuant to that certain Stock Purchase Agreement dated as of January 31, 2007 between Great-West Lifeco Inc. and Marsh & McLennan Companies, Inc. relating to the purchase and sale of Putnam Investments Trust (the Stock Purchase Agreement) with an effective time on the Closing Date (as such term is defined in the Stock Purchase Agreement).

2. It is further understood and agreed that, except as described above, Section 13. and Section 17. shall remain intact and in full force and effect and all terms, conditions and provisions of Section 13. and Section 17. remain unchanged.

ALL OTHER TERMS, CONDITIONS AND EXCLUSIONS REMAIN UNCHANGED.

RIDER #17

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

DISCOVERY AMENDATORY

It consideration of the premium charged, it is hereby understood and agreed that, as of the effective time of the Putnam Investments Acquisition (as that term is defined below), the bond is hereby amended as follows:

1. Section 4. is hereby amended by deleting the second sentence of the first paragraph in its entirety and replacing it with the following:

At the earliest practicable moment after discovery of any loss hereunder, the Chief Compliance Officer, General Counsel or Treasurer of Putnam Acquisition Financing Inc. (or the equivalent position if no such Chief Compliance Officer, General Counsel or Treasurer exists) shall give the Underwriter written notice thereof and shall also within six months after such discovery furnish to the Underwriter affirmative proof of loss with full particulars.

2. Section 4. is further amended by deleting the second paragraph in its entirety and replacing it with the following:

Discovery occurs when the Chief Compliance Officer, General Counsel or Treasurer of Putnam Acquisition Financing Inc. (or the equivalent position if no such Chief Compliance Officer, General Counsel or Treasurer exists):

(a) becomes aware of facts, or

(b) receives written notice of an actual or potential claim by a third party which alleges that the Insured is liable under circumstances

which would cause a reasonable person to assume that a loss covered by the bond has been or will be incurred even though the exact amount or details of loss may not be then known.

RIDER #17 (Continued)

Solely for the purpose of the coverage provided by this rider, the Putnam Investments Acquisition shall mean the acquisition of Putnam Investments Trust by Great-West Lifeco Inc., a subsidiary of Power Financial Corporation, pursuant to that certain Stock Purchase Agreement dated as of January 31, 2007 between Great-West Lifeco Inc. and Marsh & McLennan Companies, Inc. relating to the purchase and sale of Putnam Investments Trust (the Stock Purchase Agreement) with an effective time on the Closing Date (as such term is defined in the Stock Purchase Agreement).

ALL OTHER TERMS, CONDITIONS AND EXCLUSIONS REMAIN UNCHANGED.

RIDER #18

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

AMENDED SECTION 13

It is agreed that:

1. The attached bond is hereby amended by deleting Section 13., TERMINATION, in its entirety and substituting the following:

The Underwriter may terminate this bond as an entirety by furnishing written notice specifying the termination date which cannot be prior to 60 days after the receipt of such written notice by each Investment Company named as Insured and the Securities and Exchange Commission, Washington, D.C. The Insured may terminate this bond as an entirety by furnishing written notice to the Underwriter. When the Insured cancels, the Insured shall furnish written notice to the Securities and Exchange Commission, Washington, D.C. prior to 60 days before the effective date of the termination. The Underwriter shall notify all other Investment Companies named as Insured of the receipt of such termination notice and the termination cannot be effective prior to 60 days after receipt of written notice by all other Investment Companies. Premiums are earned until the termination date as set forth herein.

This Bond will terminate as to any one Insured, (other than a registered management investment company), immediately upon taking over of such Insured by a receiver or other liquidator or by State or Federal officials, or immediately upon the filing of a petition under any State or Federal statute relative to bankruptcy or reorganization of the Insured, or assignment for the benefit of creditors of the Insured, or immediately upon such Insured ceasing to exist, whether through merger into another entity, or by disposition of all of its assets.

This Bond will terminate as to any registered management investment company upon the expiration of 60 days after written notice has been given to the Securities and Exchange Commission, Washington, D.C.

RIDER #18 (Continued)

The Underwriter shall refund the unearned premium computed at short rates in accordance with the standard short rate cancellation tables if terminated by the Insured or pro rata if terminated for any other reason.

This bond shall terminate

a. as to any Employee as soon as the Chief Compliance Officer, General Counsel or Treasurer of Putnam Acquisition Financing Inc. (or the equivalent position if no Chief Compliance Officer, General Counsel or Treasurer exists) who is not in collusion with such Employee, shall learn of any dishonest or fraudulent act(s), including larceny or embezzlement on the part of such Employee without prejudice to the loss of any Property then in transit in the custody of such Employee and upon the expiration of sixty (60) days after written notice has been given to the Securities and Exchange Commission, Washington, D.C. (See Section 16(d)) and to the Insured Investment Company; or

b. as to any Employee 60 days after receipt by each Insured and by the Securities and Exchange Commission of a written notice from the Underwriter of its desire to terminate this bond as to such Employee; or

c. as to any person, who is a partner, officer or employee of any Electronic Data Processor covered under this bond, from and after the time that the Chief Compliance Officer, General Counsel or Treasurer of Putnam Acquisition Financing Inc. (or the equivalent position if no Chief Compliance Officer, General Counsel or Treasurer exists) not in collusion with such person shall have knowledge or information that such person has committed any dishonest or fraudulent act(s), including larceny or embezzlement in the service of the Insured or otherwise, whether such act be committed before or after the time this bond is effective and upon the expiration of sixty (60) days after written notice has been given by the Underwriter to the Securities and Exchange Commission, Washington DC and to the Insured Investment Company;

d. in the event the Chief Compliance Officer, General Counsel or Treasurer of Putnam Acquisition Financing Inc. (or the equivalent position if no Chief Compliance Officer, General Counsel or Treasurer exists) learns of a prior dishonest act committed by a current or prospective Employee, provided the amount involved is less than $25,000, the coverage is automatically reinstated provided the Chief Compliance Officer, General Counsel and Treasurer of Putnam Acquisition Financing Inc. (or the equivalent position if no Chief Compliance Officer, General Counsel or Treasurer exists) unanimously agree in writing to the reinstatement.

RIDER #18 (Continued)

e. notwithstanding anything in the foregoing to the contrary, the Underwriter agrees that this bond shall continue to apply in respect of those Employees for whom a waiver of a prior dishonesty was granted under any prior bond.

2. Nothing herein contained shall be held to vary, alter, waive, or extend any of the terms, limitations, conditions, or provisions of the attached bond other than as above stated.

RIDER #19

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of
policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

It is agreed that:

1. The term "Underwriter" as used in the attached bond shall be construed to mean, unless otherwise specified in this rider, all the Companies executing the attached bond.

2. Each of said Companies shall be liable only for such proportion of any Single Loss under the attached bond as the amount underwritten by such Company, as specified in the Schedule forming a part hereof, bears to the Aggregate Limit of Liability of the attached bond, but in no event shall any of said Companies be liable for an amount greater than that underwritten by it.

3. In the absence of a request from any of said Companies to pay premiums directly to it, premiums for the attached bond may be paid to the Controlling Company for the account of all of said Companies.

4. In the absence of a request from any of said Companies that notice of claim and proof of loss be given to or filed directly with it, the giving of such notice to and the filing of such proof with, the Controlling Company shall be deemed to be in compliance with the conditions of the attached bond for the giving of notice of loss and the filing of proof of loss, if given and filed in accordance with said conditions.

5. The Controlling Company may give notice in accordance with the terms of the attached bond, terminating or canceling the attached bond as an entirety or as to any Employee, and any notice so given shall terminate or cancel the liability of all of said Companies as an entirety or as to such Employee, as the case may be.

6. Any Company other than the Controlling Company may give notice in accordance with the terms of the attached bond, terminating or canceling the entire liability of such other Company under the attached bond or as to any Employee.

7. In the absence of a request from any of said Companies that notice of termination or cancellation by the Insured of the attached bond in its entirety be given to or filed directly with it, the giving of such notice in accordance with the terms of the attached bond to the Controlling Company shall terminate or cancel the liability of all of said Companies as an entirety. The Insured may terminate or cancel the entire liability of any Company, other than the Controlling Company, under the attached bond by giving notice of such termination or cancellation to such other Company, and shall send copy of such notice to the Controlling Company.

RIDER #19 (Continued)

8. In the event of the termination or cancellation of the attached bond as an entirety, no Company shall be liable to the Insured for a greater proportion of any return premium due the Insured than the amount underwritten by such Company bears to the Aggregate Limit of Liability of the attached bond.

9. In the event of termination or cancellation of the attached bond as to any Company, such Company alone shall be liable to the Insured for any return premium due the Insured on account of such termination or cancellation. The termination or cancellation of the attached bond as to any Company other than the Controlling Company shall not terminate, cancel or otherwise affect the liability of the other Companies under the attached bond.

Underwritten for the sum of $25,000,000, part of $70,000,000	National Union Fire Insurance Company of Pittsburgh, PA Controlling Company

Underwritten for the sum of $15,000,000, part of Great American $70,000,000 Insurance Company

By:________________________________

Underwritten for the sum of $15,000,000, part of $70,000,000 — Fidelity and Deposit Company of Maryland

By: :________________________________

Underwritten for the sum of $15,000,000, part of $70,000,000 — ACE American Insurance Company

By::________________________________

RIDER #19 (Continued)

10. Nothing herein contained shall be held to vary, alter, waive or extend any of the terms, limitations, conditions or agreements of the attached bond other than as above stated.

RIDER #20

This endorsement, effective **12:01 A.M. November 01, 2007** forms a part of policy
number **060-88-79**
issued to **THE GEORGE PUTNAM FUND OF BOSTON**

by **National Union Fire Insurance Company of Pittsburgh, Pa.**

FORMS INDEX ENDORSEMENT

The contents of the Policy is comprised of the following forms:

FORM NUMBER	EDITION DATE	FORM TITLE
MNSCPT		INVESTMENT COMPANY BLANKET BOND-DEC-PAGE
41206	09/84	INVESTMENT COMPANY BLANKET BOND-GUTS
MNSCPT		COVERAGE TERRITORY ENDORSEMENT (OFAC)
MNSCPT		NAMED INSURED

MNSCPT	COMPUTER SYSTEMS
MNSCPT	VOICE INITIATED FUNDS TRANSFERS
MNSCPT	TELEFACSIMILE TRANSFER FRAUD
MNSCPT	AUTOMATED PHONE SYSTEM
MNSCPT	UNAUTHORIZED SIGNATURES
MNSCPT	CLAIMS EXPENSE
MNSCPT	DESTRUCTION OF DATA OR PROGRAMS BY HACKER
MNSCPT	DESTRUCTION OF DATA OR PROGRAMS BY VIRUS
MNSCPT	INSURING AGREEMENT (A) FIDELITY
MNSCPT	AMENDED FORGERY OR ALTERATION
MNSCPT	AMENDED COUNTERFEIT CURRENCY
MNSCPT	INSURING AGREEMENT (D) IN TRANSIT
MNSCPT	INSURING AGREEMENT (F) SECURITIES
MNSCPT	NOTICE AND CHANGE IN CONTROL/TERMINATION AMENDATORY
MNSCPT	DISCOVERY AMENDATORY
MNSCPT	AMENDED SECTION 13
MNSCPT	COSURETY RIDER
MNSCPT	FORMS INDEX ENDORSEMENT

ALL OTHER TERMS, CONDITION AND EXCLUSIONS REMAIN UNCHANGED.

AUTHORIZED REPRESENTATIVE

NAME OF ASSURED:

THE GEORGE PUTNAM FUND OF BOSTON

One Post Office Square
Boston, MA 02109

Bond Number: 81948056

FEDERAL INSURANCE COMPANY
Incorporated under the laws of Indiana,
a stock insurance company, herein called the COMPANY

Capital Center, 251 North Illinois, Suite 1100
Indianapolis, IN 46204-1927

ITEM 1. BOND PERIOD: from 12:01 a.m. on November 1, 2007
to 12:01 a.m. on November 1, 2008

ITEM 2. AGGREGATE LIMIT OF LIABILITY: $10,000,000.

ITEM 3. SINGLE LOSS LIMIT OF LIABILITY:$10,000,000.

ITEM 4. DEDUCTIBLE AMOUNT: $70,150,000.

ITEM 5. PRIMARY BOND:

Insurer: National Union Fire Insurance Company of Pittsburgh, PA
Form and Bond No.: Investment Company Blanket Bond, Form 41206 (9-84), Bond No. 060-88-79
Limit: $70,000,000.
Deductible: $150,000./$5,000.
June 15, 2006 to
Bond Period: June 15, 2007

ITEM 6. COVERAGE EXCEPTIONS TO PRIMARY BOND:

NOTWITHSTANDING ANY COVERAGE PROVIDED BY THE PRIMARY BOND, THIS EXCESS BOND DOES NOT DIRECTLY OR INDIRECTLY COVER:
None

ITEM 7. TOTAL OF LIMITS OF LIABILITY OF OTHER UNDERLYING BONDS, EXCESS OF PRIMARY BOND:
None

ITEM 8. THE LIABILITY OF THE COMPANY IS ALSO SUBJECT TO THE TERMS OF THE FOLLOWING ENDORSEMENTS EXECUTED SIMULTANEOUSLY HEREWITH:

1 - 2

IN WITNESS WHEREOF, THE COMPANY issuing this Bond has caused this Bond to be signed by its authorized officers, but it shall not be valid unless also signed by a duly authorized representative of the Company.

Excess Bond (7-92)
Form 17-02-0842 (Ed. 7-92) Page 1 of 1

The COMPANY, in consideration of the required premium, and in reliance on the statements and information furnished to the COMPANY by the ASSURED, and subject to the DECLARATIONS made a part of this bond and to all other terms and conditions of this bond, agrees to pay the ASSURED for:

Insuring Clause

Loss which would have been paid under the **Primary Bond** but for the fact the loss exceeds the **Deductible Amount**.

Coverage under this bond shall follow the terms and conditions of the **Primary Bond**, except with respect to:

a. The coverage exceptions in ITEM 6. of the DECLARATIONS; and

b. The limits of liability as stated in ITEM 2. and ITEM 3. of the DECLARATIONS.

With respect to the exceptions stated above, the provisions of this bond shall apply.

General Agreements

Change Or Modification Of Primary Bond

A. If after the inception date of this bond the **Primary Bond** is changed or modified, written notice of any such change or modification shall be given to the COMPANY as soon as practicable, not to exceed thirty (30) days after such change or modification, together with such information as the COMPANY may request. There shall be no coverage under this bond for any loss related to such change or modification until such time as the COMPANY is advised of and specifically agrees by written endorsement to provide coverage for such change or modification.

Representations Made By Assured

B. The ASSURED represents that all information it has furnished to the COMPANY for this bond or otherwise is complete, true and correct. Such information constitutes part of this bond.

The ASSURED must promptly notify the COMPANY of any change in any fact or circumstance which materially affects the risk assumed by the COMPANY under this bond.

Any misrepresentation, omission, concealment or incorrect statement of a material fact by the ASSURED to the COMPANY shall be grounds for recision of this bond.

Notice To Company Of Legal Proceedings Against Assured - Election To Defend

C. The ASSURED shall notify the COMPANY at the earliest practical moment, not to exceed thirty (30) days after the ASSURED receives notice, of any legal proceeding brought to determine the ASSURED S liability for any loss, claim or damage which, if established, would constitute a collectible loss under this bond or any of the **Underlying Bonds**. Concurrent with such notice, and as requested thereafter, the ASSURED shall furnish copies of all pleadings and pertinent papers to the COMPANY.

General Agreements

Notice To Company Of Legal Proceedings Against Assured - Election To Defend (continued)

If the COMPANY elects to defend all or part of any legal proceeding, the court costs and attorneys fees incurred by the COMPANY and any settlement or judgment on that part defended by the COMPANY shall be a loss under this bond. The COMPANY S liability for court costs and attorneys fees incurred in defending all or part of such legal proceeding is limited to the proportion of such court costs and attorneys fees incurred that the amount recoverable under this bond bears to the amount demanded in such legal proceeding.

If the COMPANY declines to defend the ASSURED, no settlement without the prior written consent of the COMPANY or judgment against the ASSURED shall determine the existence, extent or amount of coverage under this bond, and the COMPANY shall not be liable for any costs, fees and expenses incurred by the ASSURED.

Conditions And Limitations

Definitions

1. As used in this bond:
   a. **Deductible Amount** means the amount stated in ITEM 4. of the DECLARATIONS. In no event shall this **Deductible Amount** be reduced for any reason, including but not limited to, the non-existence, invalidity, insufficiency or uncollectibility of any of the **Underlying Bonds**, including the insolvency or dissolution of any Insurer providing coverage under any of the **Underlying Bonds**.

   b. **Primary Bond** means the bond scheduled in ITEM 5. of the DECLARATIONS or any bond that may replace or substitute for such bond.
   c. **Single Loss** means all covered loss, including court costs and attorneys fees incurred by the COMPANY under General Agreement C., resulting from:
      (1) any one act of burglary, robbery or attempt either, in which no employee of the ASSURED is implicated, or
      (2) any one act or series of related acts on the part of any person resulting in damage to or destruction or misplacement of property, or
      (3) all acts other than those specified in c.(1) and c.(2), caused by any person or in which such person is implicated, or
      (4) any one event not specified above, in c.(1), c.(2) or c.(3).
   d. **Underlying Bonds** means the **Primary Bond** and all other insurance coverage referred to in ITEM 7. of the DECLARATIONS.

Excess Bond (7-92)
Form 17-02-0842 (Ed. 7-92) Page 2 of 5

Conditions And Limitations
(continued)

Limit Of Liability

Aggregate Limit Of Liability

2. The COMPANY S total cumulative liability for all **Single Losses** of all ASSUREDS discovered during the BOND PERIOD shall not exceed the AGGREGATE LIMIT OF LIABILITY as stated in ITEM 2. of the DECLARATIONS. Each payment made under the terms of this bond shall reduce the unpaid portion of the AGGREGATE LIMIT OF LIABILITY until it is exhausted.

On exhausting the AGGREGATE LIMIT OF LIABILITY by such payments:

a. the COMPANY shall have no further liability for loss or losses regardless of when discovered and whether or not previously reported to the COMPANY, and

b. the COMPANY shall have no obligation under General Agreement C. to continue the defense of the ASSURED, and on notice by the COMPANY to the ASSURED that the AGGREGATE LIMIT OF LIABILITY has been exhausted, the ASSURED shall assume all responsibility for its defense at its own cost.

The unpaid portion of the AGGREGATE LIMIT OF LIABILITY shall not be increased or reinstated by any recovery made and applied in accordance with Section 4. In the event that a loss of property is settled by indemnity in lieu of payment, then such loss shall not reduce the unpaid portion of the AGGREGATE LIMIT OF LIABILITY.

Single Loss Limit Of Liability

The COMPANY S liability for each **Single Loss** shall not exceed the SINGLE LOSS LIMIT OF LIABILITY as stated in ITEM 3. of the DECLARATIONS or the unpaid portion of the AGGREGATE LIMIT OF LIABILITY, whichever is less.

Discovery

3. This bond applies only to loss first discovered by the ASSURED during the BOND PERIOD. Discovery occurs at the earlier of the ASSURED being aware of:

a. facts which may subsequently result in a loss of a type covered by this bond, or

b. an actual or potential claim in which it is alleged that the ASSURED is liable to a third party,

regardless of when the act or acts causing or contributing to such loss occurred, even though the amount of loss does not exceed the applicable **Deductible Amount**, or the exact amount or details of loss may not then be known.

Subrogation-Assignment-Recovery

4. In the event of a payment under this bond, the COMPANY shall be subrogated to all of the ASSURED S rights of recovery against any person or entity to the extent of such payments. On request, the ASSURED shall deliver to the COMPANY an assignment of the ASSURED S rights, title and interest and causes of action against any person or entity to the extent of such payment.

Conditions And Limitations

Subrogation-Assignment-Recovery (continued)

Recoveries, whether effected by the COMPANY or by the ASSURED, shall be applied net of the expense of such recovery, first, to the satisfaction of the ASSURED S loss which would otherwise have been paid but for the fact that it is in excess of the AGGREGATE LIMIT OF LIABILITY, second, to the COMPANY in satisfaction of amounts paid in settlement of the ASSURED S claim and third, to the ASSURED in satisfaction of the DEDUCTIBLE AMOUNT. Recovery from reinsurance and/or indemnity of the COMPANY shall not be deemed a recovery under this Section.

Cooperation Of Assured

5. At the COMPANY S request and at reasonable times and places designated by the COMPANY the ASSURED shall:

a. submit to examination by the COMPANY and subscribe to the same under oath, and
b. produce for the COMPANY S examination all pertinent records, and
c. cooperate with the COMPANY in all matters pertaining to the loss.

The ASSURED shall execute all papers and render assistance to secure to the COMPANY the rights and causes of action provided for under this bond. The ASSURED shall do nothing after loss to prejudice such rights or causes of action.

Termination

6. This bond terminates as an entirety on the earliest occurrence of any of the following:

a. sixty (60) days after the receipt by the ASSURED of a written notice from the COMPANY of its decision to terminate this bond, or
b. immediately on the receipt by the COMPANY of a written notice from the ASSURED of its decision to terminate this bond, or
c. immediately on the appointment of a trustee, receiver or liquidator to act on behalf of the ASSURED, or the taking over of the ASSURED by State or Federal officials, or
d. immediately on the dissolution of the ASSURED, or
e. immediately on exhausting the AGGREGATE LIMIT OF LIABILITY, or

f. immediately on expiration of the BOND PERIOD, or

g. immediately on cancellation, termination or recision of the **Primary Bond**.

Conformity

7. If any limitation within this bond is prohibited by any law controlling this bond s construction, such limitation shall be deemed to be amended so as to equal the minimum period of limitation provided by such law.

Excess Bond (7-92)
Form 17-02-0842 (Ed. 7-92) Page 4 of 5

Conditions And Limitations
(continued)

Change Or Modification Of This Bond

8. This bond or any instrument amending or affecting this bond may not be changed or modified orally. No change in or modification of this bond shall be effective except when made by written endorsement to this bond signed by an Authorized Representative of the COMPANY.

Excess Bond (7-92)
Form 17-02-0842 (Ed. 70-2) Page 5 of 5

Effective date of
this endorsement: November 1, 2007

FEDERAL INSURANCE COMPANY
Endorsement No.: 1
To be attached to and form a part of Bond
Number: 81948056

Issued to: THE GEORGE PUTNAM FUND OF BOSTON

COMPLIANCE WITH APPLICABLE TRADE SANCTION LAWS RIDER

It is agreed that this insurance does not apply to the extent that trade or economic sanctions or other laws or regulations prohibit the coverage provided by this insurance.

ALL OTHER TERMS AND CONDITIONS OF THIS BOND REMAIN UNCHANGED.

Date: December 4, 2007

Form 14-02-9228 (Ed. 4/2004)

ENDORSEMENT/RIDER

Effective date of
this endorsement/rider: November 1, 2007

FEDERAL INSURANCE COMPANY
Endorsement/Rider No. 2
To be attached to and
form a part of Bond No. 81948056

Issued to: THE GEORGE PUTNAM FUND OF BOSTON

REMOVE AGGREGATE LIMIT OF LIABILITY ENDORSEMENT

In consideration of the premium charged, it is agreed that this bond is amended as follows:

1. By deleting in its entirety ITEM 2., AGGREGATE LIMIT OF LIABILITY, on the DECLARATIONS.
2. By deleting in its entirety Section 2., Limit of Liability, and substituting the following:

   Section 2. Single Loss Limit of Liability

   The COMPANY S liability for each **Single Loss** discovered during the BOND PERIOD shall not exceed the applicable SINGLE LOSS LIMIT OF LIABILITY as stated in ITEM 3. of the DECLARATIONS. If a **Single Loss** is covered under more than one INSURING CLAUSE, the maximum payable shall not exceed the largest applicable SINGLE LOSS LIMIT OF LIABILITY.
3. By deleting in its entirety the second paragraph of Section 4., Subrogation-Assignment-Recovery, and substituting the following:

   Recoveries, whether effected by the COMPANY or by the ASSURED, shall be applied net of the expense of such recovery, first, to the satisfaction of the ASSURED S loss which would otherwise have been paid, second, to the COMPANY in satisfaction of amounts paid in settlement of the ASSURED S claim and third, to the ASSURED in satisfaction of the DEDUCTIBLE AMOUNT. Recovery from reinsurance and/or indemnity of the COMPANY shall not be deemed a recovery under this Section.
4. By deleting in its entirety subparagraph e. from Section 6, Termination.

The title and any headings in this endorsement/rider are solely for convenience and form no part of the terms and conditions of coverage.

All other terms, conditions and limitations of this Bond shall remain unchanged.

14-02-13158 (05/2007) Page 1

IMPORTANT NOTICE TO POLICYHOLDERS

All of the members of the Chubb Group of Insurance companies doing business in the United States (hereinafter Chubb) distribute their products through licensed insurance brokers and agents (producers). Detailed information regarding the types of compensation paid by Chubb to producers on US insurance transactions is available under the Producer Compensation link located at the bottom of the page at www.chubb.com, or by calling 1-866-588-9478. Additional information may be available from your producer.

Thank you for choosing Chubb.

10-02-1295 (ed. 5/2007)

Chubb & Son, div. of Federal Insurance Company
as manager of the member insurers of the
Chubb Group of Insurance Companies

POLICYHOLDER DISCLOSURE NOTICE OF TERRORISM INSURANCE COVERAGE

(for policies with no terrorism exclusion or sublimit)

You are hereby notified that, under the Terrorism Risk Insurance Act of 2002 (the Act) effective November 26, 2002, this policy makes available to you insurance for losses arising out of certain acts of international terrorism. Terrorism is defined as any act certified by the Secretary of the Treasury, in concurrence with the Secretary of State and the Attorney General of the United States, to be an act of terrorism; to be a violent act or an act that is dangerous to human life, property or infrastructure; to have resulted in damage within the United States, or outside the United States in the case of an air carrier or vessel or the premises of a United States Mission; and to have been committed by an individual or individuals acting on behalf of any foreign person or foreign interest, as part of an effort to coerce the civilian population of the United States or to influence the policy or affect the conduct of the United States Government by coercion.

You should know that the insurance provided by your policy for losses caused by acts of terrorism is partially reimbursed by the United States under the formula set forth in the Act. Under this formula, the United States pays 90% of covered terrorism losses that exceed the statutorily established deductible to be paid by the insurance company providing the coverage. The portion of your policy s annual premium that is attributable to insurance for such acts of terrorism is: $ **-0-.**

If you have any questions about this notice, please contact your agent or broker.

Form 10-02-1281 (Ed. 1/2003)

FEDERAL INSURANCE COMPANY

Endorsement No: 3

Bond Number: 819

NAME OF ASSURED: THE GEORGE PUTNAM FUND OF BOSTON

NAME OF ASSURED ENDORSEMENT

It is agreed that the NAME OF ASSURED in the DECLARATIONS is amended to read as follows:

THE GEORGE PUTNAM FUND OF BOSTON, AS MORE FULLY DESCRIBED IN THE UNDERLYING PRIMARY BOND REFERRED TO IN ITEM 5. OF THE DECLARATIONS.

This Endorsement applies to loss discovered after 12:01 a.m. on November 1, 2007.
ALL OTHER TERMS AND CONDITIONS OF THIS BOND REMAIN UNCHANGED.

Date: December 5, 2007

ICAP Bond
Form 17-02-0949 (Ed. 1-97) Page 1

Exhibit 2

Resolutions adopted by the Board of Trustees of the Putnam Funds on November 9, 2007

VOTED: That the action of each Fund in joining the other Putnam Funds, Putnam Investment Management, LLC, Putnam Retail Management Limited Partnership, Putnam Fiduciary Trust Company and certain of their affiliates on their joint Registered Management Investment Company fidelity bonds covering larceny and embezzlement and certain other acts in the total amount of $80 million, is confirmed and ratified, it being the understanding of each Fund that the cost of said bonds to such Fund will be such Fund's ratable share of the premium and brokerage commission for the bonds for the 12-month period ending June 15, 2007 of which 85% of the cost is allocated to The Putnam Funds, based on the net asset value from time to time of the Fund and the other Putnam Funds party to said bonds.

VOTED: That each Fund's entry into an agreement with the other parties to the joint fidelity bonds authorized pursuant to the immediately preceding vote, stating that in the event recovery is received under the bonds as a result of the loss of each Fund and of one or more of the other named insureds, each Fund shall receive an equitable and proportionate share of recovery but at least equal to the amount it would have received had it provided and maintained a single insured bond with the minimum coverage required under Rule 17g-1 under the Investment Company Act of 1940, as amended, is confirmed and ratified.

VOTED: That the designation, pursuant to Rule 17g-1 under the Investment Company Act of 1940, as amended, of Beth S. Mazor, Vice President of the Fund, as agent for each Fund to make the filings and give the notices required by subparagraph (g) of said Rule is confirmed and ratified.

VOTED: That the form and amount of the bonds referred to in the preceding votes, after consideration of all relevant factors including each Fund□s aggregate assets to which persons covered by the bonds have access, the type and terms of arrangements made for custody and safekeeping of assets, and the nature of the securities held, and with the changes approved by Ms. Baxter, is confirmed and ratified.

Resolutions adopted by the Board of Trustees of TH Lee, Putnam Investment Trust on December 12, 2007

VOTED: That the action of the Trust□s TH Lee, Putnam Emerging Opportunities Portfolio series (the □Fund□) in joining The Putnam Funds, TH Lee, Putnam Capital Management, LLC, Putnam Investment Management, LLC, Putnam Retail Management Limited Partnership and Putnam Fiduciary Trust Company on their joint Registered Management Investment Company fidelity bonds covering larceny and embezzlement and certain other acts in the total amount of $80 million, in such amounts to be allocated among such insurance carriers as the President or any Vice President of the Trust may approve, is hereby ratified, approved and confirmed, it being the understanding of the Fund that the cost of said bonds to the Fund will be the Fund□s ratable share of the premium for the bonds for the period from November 1, 2 007 to October 31, 2008, of which 85% of the cost is allocated to the Fund and The Putnam Funds, based on the relative net asset value from time to time of the Fund and The Putnam Funds party to said bonds.

VOTED: That the Fund□s execution of an agreement with the other parties to the joint fidelity bonds authorized pursuant to the immediately preceding vote, stating that in the event recovery is received under the bonds as a result of the loss of the fund and of one or more of the other named insureds, the Fund shall receive an equitable and proportionate share of recovery, but at least equal to the amount it would have received had it provided and maintained a single insured bond with the minimum coverage required under Rule 17g-1 under the Investment Company Act of 1940, as amended, is hereby ratified, approved and confirmed.

VOTED: That pursuant to Rule 17g-1 under the Investment Company Act of 1940, as amended, each of the officers of the Trust hereby is designated as agent for the Fund to make the filings and give the notices required by subparagraph (g) of said Rule.

VOTED: That the form and amount of the bonds referred to in the preceding votes, after consideration of all relevant factors, including the Fund□s aggregate assets to which persons covered by the bonds have access, the type and terms of arrangements made for custody and safekeeping of assets, and the nature of the securities held, are hereby approved specifically.

Exhibit 3

AGREEMENT

WHEREAS the undersigned parties have determined that it is in their best interests to enter into a joint fidelity bond, which bond is intended to meet the applicable standards of Rule 17g-1 under the Investment Company Act of 1940 (the "Act"); and

WHEREAS Rule 17g-1 under the Act requires that each registered management investment company entering into a joint fidelity bond shall agree with the other named insureds as to the allocation of the recovery received under the joint bond as a result of the loss sustained by the registered management investment company and one or more of the other named insureds.

NOW, THEREFORE, in consideration of the foregoing and of other good and valuable consideration, the undersigned parties hereby agree as follows:

1. In the event recovery is received under the bond as a result of a loss sustained by one of the registered management investment companies party to this Agreement and one or more other named insureds, the registered management investment company shall receive an equitable and proportionate share of the recovery, but at least equal to the amount it would have received had it provided and maintained a single insured bond with the minimum coverage required under Rule 17g-1 under the Act.

2. This Agreement shall be governed by and construed in accordance with the laws of The Commonwealth of Massachusetts.

3. A copy of the Declaration of Trust of each of the registered management investment companies is on file with the Secretary of The Commonwealth of Massachusetts, and notice is hereby given that this instrument is executed on behalf of the Trustees of each registered management investment company as Trustees and not individually and that the obligations of or arising out of this instrument are not binding upon any of the Trustees, officers or shareholders individually but are binding only upon the assets and property of the registered management investment company.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, each of the undersigned has caused this Agreement to be executed by a duly authorized officer as of April 4, 2007.

THE PUTNAM FUNDS LISTED ON EXHIBIT A

By: /s/ Charles E. Porter

Charles E. Porter

Executive Vice President, Associate Treasurer and Principal Executive Officer

TH LEE, PUTNAM INVESTMENT TRUST

By: /s/ James F. Clark

James F. Clark

Vice President

PUTNAM INVESTMENT MANAGEMENT, LLC

PUTNAM RETAIL MANAGEMENT LIMITED PARTNERSHIP

By: /s/ Beth F. Mazor

Beth S. Mazor

Managing Director

PUTNAM FIDUCIARY TRUST COMPANY

By: /s/ Robert R. Leveille

Robert R. Leveille

Managing Director

EXHIBIT A

Putnam American Government Income Fund

Putnam Arizona Tax Exempt Income Fund

Putnam Asset Allocation Funds

-Balanced Portfolio

-Conservative Portfolio

-Growth Portfolio

Putnam California Investment Grade Municipal Trust

Putnam California Tax Exempt Income Fund

Putnam Capital Appreciation Fund

Putnam Classic Equity Fund

Putnam Convertible Income-Growth Trust

Putnam Discovery Growth Fund

Putnam Diversified Income Trust

Putnam Equity Income Fund

Putnam Europe Equity Fund

Putnam Funds Trust

-Putnam Floating Rate Daily Income Fund

-Putnam Income Opportunities Fund

-Putnam International Growth and Income Fund

-Putnam Prime Money Market Fund

-Putnam Small Cap Growth Fund

The George Putnam Fund of Boston

Putnam Global Equity Fund

Putnam Global Income Trust

Putnam Global Natural Resources Fund

The Putnam Fund for Growth and Income

Putnam Health Sciences Trust

Putnam High Income Bond Fund

Putnam High Income Opportunities Trust

Putnam High Yield Advantage Fund

Putnam High Yield Municipal Trust

Putnam High Yield Trust

Putnam Income Fund

Putnam Intermediate U.S. Government Income Fund

Putnam International Equity Fund

Putnam Investment Funds

-Putnam Capital Opportunities Fund

-Putnam Growth Opportunities Fund

-Putnam International Capital Opportunities Fund

-Putnam International New Opportunities Fund

-Putnam Mid Cap Value Fund

-Putnam New Value Fund

-Putnam Research Fund

-Putnam Small Cap Value Fund

Putnam Investment Grade Municipal Trust

Putnam Investors Fund

Putnam Managed Municipal Income Trust

Putnam Massachusetts Tax Exempt Income Fund

Putnam Master Income Trust

Putnam Master Intermediate Income Trust

Putnam Michigan Tax Exempt Income Fund

Putnam Minnesota Tax Exempt Income Fund

Putnam Money Market Fund

Putnam Municipal Bond Fund

Putnam Municipal Income Fund

Putnam Municipal Opportunities Trust

Putnam New Jersey Tax Exempt Income Fund

Putnam New Opportunities Fund

Putnam New York Investment Grade Municipal Trust

Putnam New York Tax Exempt Income Fund

Putnam Ohio Tax Exempt Income Fund

Putnam OTC & Emerging Growth Fund

Putnam Pennsylvania Tax Exempt Income Fund

Putnam Premier Income Trust

Putnam RetirementReady Funds

Putnam Tax Exempt Income Fund

Putnam Tax Exempt Money Market Fund

Putnam Tax-Free Health Care Fund

Putnam Tax-Free Income Trust

-Putnam Tax-Free High Yield Fund

-Putnam Tax-Free Insured Fund

Putnam Tax Smart Funds Trust

-Putnam Tax Smart Equity Fund

Putnam U.S. Government Income Trust

Putnam Utilities Growth and Income Fund

Putnam Variable Trust

-Putnam VT American Government Income Fund

-Putnam VT Capital Appreciation Fund

-Putnam VT Capital Opportunities Fund

-Putnam VT Discovery Growth Fund

-Putnam VT Diversified Income Fund

-Putnam VT Equity Income Fund

-Putnam VT The George Putnam Fund of Boston

-Putnam VT Global Asset Allocation Fund

-Putnam VT Global Equity Fund

-Putnam VT Growth and Income Fund

-Putnam VT Growth Opportunities Fund

-Putnam VT Health Sciences Fund

-Putnam VT High Yield Fund

-Putnam VT Income Fund

-Putnam VT International Equity Fund

-Putnam VT International Growth and Income Fund

-Putnam VT International New Opportunities Fund

-Putnam VT Investors Fund

-Putnam VT Mid Cap Value Fund

-Putnam VT Money Market Fund

-Putnam VT New Opportunities Fund

-Putnam VT New Value Fund

-Putnam VT OTC & Emerging Growth Fund

-Putnam VT Research Fund

-Putnam VT Small Cap Value Fund

-Putnam VT Utilities Growth and Income Fund

-Putnam VT Vista Fund

-Putnam VT Voyager Fund

Putnam Vista Fund

Putnam Voyager Fund

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m" COLSPAN="2" ALIGN="center" STYLE="border-bottom:1.00pt solid #000000">2016 2015 2016 2015

Forward exchange contracts:

Net loss recognized in income[1]

$(378) $(108) $(943) $(10)

[1] The Company enters into foreign exchange contracts to hedge against changes in the balance sheet for certain subsidiaries and also enters into foreign currency option contracts to mitigate the risk associated with certain foreign currency transactions in the ordinary course of business. These derivatives are not designated as hedging instruments and gains or losses from these derivatives are recorded immediately in selling, general and administrative expenses.

7) Inventories

Inventories consist of the following:

	June 30, 2016	December 31, 2015
Raw materials	$ 100,901	$ 78,352
Work-in-process	97,587	23,297
Finished goods	79,872	50,982
	$ 278,360	$ 152,631

8) Goodwill and Intangible Assets

Goodwill

The Company s methodology for allocating the purchase price relating to purchase acquisitions is determined through established and generally accepted valuation techniques. Goodwill is measured as the excess of the cost of the acquisition over the sum of the amounts assigned to tangible and identifiable intangible assets acquired less liabilities assumed. The Company assigns assets acquired (including goodwill) and liabilities assumed to one or more reporting units as of the date of acquisition. Typically acquisitions relate to a single reporting unit and thus do not require the allocation of goodwill to multiple reporting units. If the products obtained in an acquisition are assigned to multiple reporting units, the goodwill is distributed to the respective reporting units as part of the purchase price allocation process.

Goodwill and purchased intangible assets with indefinite useful lives are not amortized, but are reviewed for impairment annually during the fourth quarter of each fiscal year and whenever events or changes in circumstances indicate that the carrying value of an asset may not be recoverable. The process of evaluating the potential impairment of goodwill and intangible assets requires significant judgment. The Company regularly monitors current business conditions and other factors including, but not limited to, adverse industry or economic trends, restructuring actions and lower projections of profitability that may impact future operating results.

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MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

The changes in the carrying amount of goodwill and accumulated impairment (loss) during the six months ended June 30, 2016 and year ended December 31, 2015 were as follows:

	Six Months Ended June 30, 2016			Twelve Months Ended December 31, 2015		
	Gross Carrying Amount	Accumulated Impairment (Loss)	Net	Gross Carrying Amount	Accumulated Impairment (Loss)	Net
Beginning balance at January 1	$ 339,117	$ (139,414)	$ 199,703	$ 331,795	$ (139,414)	$ 192,381
Acquired goodwill[1]	395,784		395,784	8,017		8,017
Foreign currency translation	(2,882)		(2,882)	(695)		(695)
Ending balance at June 30, 2016 and December 31, 2015	$ 732,019	$ (139,414)	$ 592,605	$ 339,117	$ (139,414)	$ 199,703

(1) During 2016, the Company recorded $395,784 of goodwill related to the Newport Merger. During 2015, the Company recorded $7,042 of goodwill related to the acquisition of Precisive. During 2015, the Company recorded a purchase accounting adjustment of $975 primarily related to an inventory valuation adjustment related to an acquisition that occurred in 2014.

Intangible Assets

Components of the Company s intangible assets are comprised of the following:

As of June 30, 2016:	Gross	Accumulated Amortization	Foreign Currency Translation	Net
Completed technology[1]	$ 176,586	$ (85,881)	$ (366)	$ 90,339
Customer relationships[1]	280,344	(20,906)	(1,114)	258,324
Patents, trademarks, trade names and other[1]	99,822	(28,314)	39	71,547
In-process research and development	6,899		(126)	6,773
	$ 563,651	$ (135,101)	$ (1,567)	$ 426,983

As of December 31, 2015:	Gross	Accumulated Amortization	Foreign Currency Translation	Net
Completed technology [2]	$ 101,200	$ (82,330)	$ (272)	$ 18,598
Customer relationships [2]	37,251	(16,345)	10	20,916
Patents, trademarks, trade names and other [2]	30,396	(25,888)	5	4,513
	$ 168,847	$ (124,563)	$ (257)	$ 44,027

(1) During 2016, the Company recorded $394,804 of separately identified intangible assets related to the Newport Merger, of which $75,386 was completed technology, $243,093 was customer relationships, $69,426 was patents, trademarks, trade names and other, and $6,899 was in-process research and development.

(2) During 2015, the Company recorded $5,110 of separately identified intangible assets related to the acquisition of Precisive, of which $820 was completed technology, $1,430 was customer relationships and $2,860 was patents, trademarks, trade names and other.

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NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

Aggregate amortization expense related to acquired intangibles for the six months ended June 30, 2016 and 2015 was $10,538 and $3,380, respectively. Estimated amortization expense for each of the remaining fiscal years is as follows:

Year	Amount
2016 (remaining)	$ 24,739
2017	41,424
2018	37,376
2019	37,333
2020	33,351
2021	26,896
Thereafter	170,664

9) Other Assets

	June 30, 2016	December 31, 2015
Other Current Assets:		
Income tax receivable	$ 15,923	$ 8,682
Prepaid income tax	10,257	4,755
Other	31,815	13,323
Total other current assets	$ 57,995	$ 26,760
Other Assets:		
Deferred tax assets, net	$ 2,893	$ 19,252
Israeli pension assets	13,611	
Other	8,072	1,998
Total other assets	$ 24,576	$ 21,250

10) Other Liabilities

	June 30, 2016	December 31, 2015

Other Current Liabilities:				
VAT payable	$	4,889	$	3,075
Customer prepayments		4,960		1,741
Product warranties		7,936		5,205
Deferred revenue		13,582		7,189
Other		35,725		18,149
Total other current liabilities	$	67,092	$	35,359

Other Liabilities:				
Long-term income tax payable	$	10,281	$	4,483
Accrued compensation		12,398		13,395
Long-term pension liability		30,409		
Other		3,733		949
Total other liabilities	$	56,821	$	18,827

11) Debt

Term Loan Credit Agreement

In connection with the completion of the Newport Merger, the Company entered into a term loan credit agreement (the Credit Agreement) with Barclays Bank PLC, as administrative agent and collateral agent, and the lenders from time to time party thereto (the Lenders), that provided senior secured financing of $780,000, subject to increase at the Company s option in accordance with the Credit Agreement (the Term Loan Facility). Borrowings under the Term Loan Facility bear interest per annum at one of the following rates selected by the Company: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the prime rate quoted in The Wall Street Journal, (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month adjusted for certain additional costs, plus 1.00%, and (4) a floor of 1.75%, plus, in each

MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

case, an applicable margin of 3.00%; or (b) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the interest period relevant to such borrowing adjusted for certain additional costs, subject to a LIBOR rate floor of 0.75%, plus an applicable margin of 4.00%. The Company has elected Option B for interest rates. The Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

The term loans are prepayable in whole or in part from time to time, subject to a prepayment premium if prepayment is made on or prior to October 29, 2016 and only in certain circumstances. The Company will be obligated to pay a prepayment fee equal to 1.00% of the amount of the term loans outstanding immediately prior to any amendment resulting in a repricing transaction.

On June 9, 2016, the Company entered into Amendment No. 1 (the Repricing Amendment) to the Credit Agreement by and among the Company, the Lenders and Barclays Bank PLC, as administrative agent and collateral agent for the Lenders. The Repricing Amendment decreased the applicable margin for borrowings under the Company s Term Loan Facility to 2.50% for base rate borrowings and 3.50% for LIBOR borrowings and extended the period during which a prepayment premium may be required for a Repricing Transaction (as defined in the Credit Agreement) until six months after the effective date of the Repricing Amendment. In connection with the execution of the Repricing Amendment, the Company paid a prepayment premium of 1.00%, or $7,300, as well as certain fees and expenses of the administrative agent and the Lenders, in accordance with the terms of the Credit Agreement. Immediately prior to the effectiveness of the Repricing Amendment, the Company prepaid $50,000 of principal under the Credit Agreement, reducing the outstanding principal under the Credit Agreement from $780,000 to $730,000.

The Company incurred $28,747 of deferred finance fees, original issue discount and a repricing fee related to the term loans, which are included in long-term debt in the accompanying consolidated balance sheets and will be amortized to interest expense over the estimated life of the term loans using the effective interest method.

Under the Credit Agreement, the Company is required to prepay outstanding term loans, subject to certain exceptions, with portions of its annual excess cash flow as well as with the net cash proceeds of certain asset sales, certain casualty and condemnation events and the incurrence or issuance of certain debt. The Company is also required to make scheduled quarterly payments each equal to 0.25% of the original principal amount of the term loans made on the closing date with such original principal amount reduced by any prepayments (such as the $50,000 prepaid to date), with the balance due on the seventh anniversary of the closing date.

All obligations under the Term Loan Facility are guaranteed by certain of the Company s domestic subsidiaries, and are secured by substantially all of the Company s assets and the assets of such subsidiaries, subject to certain exceptions and exclusions.

The Credit Agreement contains customary representations and warranties, affirmative and negative covenants and provisions relating to events of default. If an event of default occurs, the Lenders under the Term Loan Facility will be entitled to take various actions, including the acceleration of amounts due under the Term Loan Facility and all actions generally permitted to be taken by a secured creditor. At June 30, 2016, the Company is in compliance with all covenants under the Credit Agreement.

Senior Secured Asset-Based Revolving Credit Facility

In connection with the completion of the Newport Merger, the Company also entered into an asset-based credit agreement with Deutsche Bank AG New York Branch, as administrative agent and collateral agent, the other borrowers from time to time party thereto, and the lenders and letters of credit issuers from time to time party thereto (the ABL Facility), that provides senior secured financing of up to $50,000, subject to a borrowing base limitation. The borrowing base for the ABL Facility at any time equals the sum of: (a) 85% of certain eligible accounts; plus (b) subject to certain notice and field examination and appraisal requirements, the lesser of (i) the lesser of (A) 65% of the lower of cost or market value of certain eligible inventory and (B) 85% of the net orderly liquidation value of certain eligible inventory and (ii) 30% of the borrowing base; minus (c) reserves established by the administrative agent; provided that until the administrative agent s receipt of a field examination of accounts receivable the borrowing base shall be equal to 70% of the book value of certain eligible accounts. The ABL Facility includes borrowing capacity in the form of letters of credit up to $15,000. The Company has not drawn against the ABL Facility.

Borrowings under the ABL Facility bear interest per annum at one of the following rates selected by the Company: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the prime rate quoted in the The Wall Street Journal, and (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month adjusted for certain additional costs, plus 1.00%, plus, in each case, an initial applicable margin of 0.75%; and (b) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the interest period relevant to such borrowing adjusted for certain additional costs, plus an initial applicable margin of 1.75%. Commencing with the completion of the first fiscal quarter ending after the closing of the ABL Facility, the applicable margin for borrowings thereunder is subject to upward or downward adjustment each fiscal quarter, based on the average historical excess availability during the preceding quarter.

The Company incurred $1,201 of costs in connection with the ABL Facility which were capitalized and included in other assets in the accompanying consolidated balance sheets and will be amortized to interest expense using the straight-line method over the contractual term of five years of the ABL Facility.

In addition to paying interest on outstanding principal under the ABL Facility, the Company is required to pay a commitment fee in respect of the unutilized commitments thereunder. The initial commitment fee is 0.375% per annum. Commencing with the completion of the first fiscal quarter ending after the closing of the ABL Facility, the commitment fee is subject to downward adjustment based on the amount of average unutilized commitments for the three-month period immediately preceding such adjustment date. The Company must also pay customary letter of credit fees and agency fees.

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MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

Lines of Credit and Short-Term Borrowing Arrangements

One of the Company s Japanese subsidiaries has lines of credit and short-term borrowing arrangements with two financial institutions which arrangements generally expire and are renewed at three-month intervals. The lines of credit provided for aggregate borrowings as of June 30, 2016 of up to an equivalent of $22,369 U.S. dollars. One of the borrowing arrangements has an interest rate based on the Tokyo Interbank Offer Rate at the time of borrowing and the other has an interest rate based on the Japanese Short-term Prime Lending Rate. There were no borrowings outstanding under these arrangements at June 30, 2016 and December 31, 2015.

The Company assumed various revolving lines of credit and a financing facility with the completion of the Newport Merger. These revolving lines of credit and financing facility have no expiration date and provided for aggregate borrowings as of June 30, 2016 of up to an equivalent of $9,726 U.S. dollars. Both revolving lines of credit have a base interest rate of 1.25% plus a Japanese Yen overnight LIBOR rate.

One of the Company s Austrian subsidiaries has four outstanding loans from the Austrian government to fund research and development. These loans are unsecured and do not require principal repayment as long as certain conditions are met. Interest on these loans is payable semi-annually. The interest rates associated with these loans range from 0.75% - 2.00%.

Short-term debt:	June 30, 2016
Japanese lines of credit	$ 5,050
Japanese receivables financing facility	308
Other short-term obligations	20
Current portion of Term Loan Facility	7,300
	$ 12,678

Long-term debt:	June 30, 2016
Austrian loans due through March 2020	$ 585
Term Loan Facility, net (1)	696,321
	$ 696,906

(1) Net of original issuance discount and refinance premium of $13,871 and deferred financing fees of $12,508.

For the three and six months ended June 30, 2016, the Company recognized interest expense of $8,397 in relation to the Term Loan Facility, including $2,368 related to deferred finance fees, original issue discount and a repricing fee.

Contractual maturities of the Company s debt obligations as of June 30, 2016 are as follows:

Year	Amount
2016 (remaining)	$ 9,008
2017	7,393
2018	7,312
2019	7,722
2020	7,344
2021	7,300
Thereafter	689,850

12) Product Warranties

The Company records the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. While the Company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component suppliers, the Company s warranty obligation is affected by shipment volume, product failure rates, utilization levels, material usage, and supplier warranties on parts delivered to the Company. Should actual product failure rates, utilization levels, material usage, or supplier warranties on parts differ from the Company s estimates, revisions to the estimated warranty liability would be required. The product warranty liability is included in other current liabilities in the condensed consolidated balance sheet.

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MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

Product warranty activities were as follows:

	Six Months Ended June 30, 2016	Six Months Ended June 30, 2015
Beginning of period	$ 5,205	$ 6,266
Assumed product warranty liability from Newport Merger	3,040	
Provision for product warranties	2,991	2,095
Direct charges to warranty liability	(3,202)	(2,434)
Foreign currency translation	8	(51)
End of period [1]	$ 8,042	$ 5,876

(1) Short-term product warranty of $7,936 and long-term product warranty of $106 are included in other current liabilities and other liabilities, respectively, in the accompanying condensed consolidated balance sheet.

13) Pension Plans

As a result of the Newport Merger, the Company has assumed all assets and liabilities of Newport s defined benefit pension plans, which cover substantially all of its full-time employees in France, Germany, Israel and Japan. In addition, there are certain pension liabilities relating to former employees in the United Kingdom. The German plan is unfunded, as permitted under the plan and applicable laws.

For financial reporting purposes, the calculation of net periodic pension costs was based upon a number of actuarial assumptions including a discount rate for plan obligations, an assumed rate of return on pension plan assets and an assumed rate of compensation increase for employees covered by the plan. All of these assumptions were based upon management s judgment, considering all known trends and uncertainties. Actual results that differ from these assumptions would impact future expense recognition and the cash funding requirements of the Company s pension plans.

The Company has included the net periodic benefit costs for the plans from the date of the acquisition on April 29, 2016 through June 30, 2016. The net periodic benefit costs included the following components:

	Two months ended June 30, 2016

Service cost	$	403
Interest cost on projected benefit obligations		80
Expected return on plan assets		(31)
	$	452

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MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

The projected benefit obligation and plan assets assumed as part of the acquisition, the changes to these amounts and their balances as of June 30, 2016 were as follows:

		June 30, 2016
Change in projected benefit obligations:		
Liabilities assumed through acquisition on April 29, 2016	$	22,563
Service cost		403
Interest cost		80
Benefits paid		(121)
Currency translation adjustments		(598)
Projected benefit obligation as of June 30, 2016	$	22,327
Change in plan assets:		
Assets assumed through acquisition on April 29, 2016		7,907
Company contributions		35
Gain on plan assets		23
Fair value of plan assets as of June 30, 2016		7,965
Funded status	$	(14,362)
Amounts recognized in the balance sheet:		
Current portion of pension liabilities	$	(100)
Pension liabilities		(14,262)
Net amount recognized	$	(14,362)

The Company s Israeli subsidiaries have pension plans that are accounted for using the shut-down method of accounting. Under the shut-down method, the liability is calculated as if it was payable as of each balance sheet date, on an undiscounted basis and plan assets are reported separate from the pension liability. As a result, the Israeli plan assets and vested benefit obligation are not included in the Company s plan assets and projected benefit obligation shown above. These Israeli plans had assets of $13,611 and vested benefit obligations of $16,147, which were presented on a gross basis as of June 30, 2016. Israeli plan assets and liabilities are included in other assets and other liabilities, respectively in the accompanying condensed consolidated balance sheet.

Other Pension-Related Assets

As of June 30, 2016, the Company had assets with an aggregate market value of $5,930, which it has set aside in connection with its German pension plans. These assets are invested in group insurance contracts through the insurance company administering these plans, in accordance with applicable pension laws. Because these assets were not separate legal assets of the pension plan, they were not included in the Company s plan assets shown above. However, the Company has designated such assets to pay pension benefits and these assets are included in long-term investments in the accompanying condensed consolidated balance sheet.

14) Income Taxes

The Company s effective tax rate for the three and six months ended June 30, 2016 was 25.5% and 26.0%, respectively. The effective tax rate for the three and six months ended June 30, 2016 was lower than the U.S. statutory tax rate primarily due to the geographic mix of income and profits earned by the Company s international subsidiaries being taxed at rates lower than the U.S. statutory tax rate, the federal research credit and the deduction for domestic production activities, offset by non-deductible acquisition-related costs and state income taxes. The Company s effective tax rate for the three and six months ended June 30, 2015 was 29.1% and 29.0%, respectively. The effective tax rate for the three and six months ended June 30, 2015 was lower than the U.S. statutory tax rate primarily due to the geographic mix of income and profits earned by the Company s international subsidiaries being taxed at rates lower than the U.S. statutory tax rate and the deduction for domestic production activities.

As of June 30, 2016, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately $23,740. At December 31, 2015, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately $4,332. The net increase from December 31, 2015 was primarily attributable to the addition of historical Newport gross unrecognized tax benefits included as a result of the Newport Merger. As of June 30, 2016, if these gross unrecognized tax benefits were recognized in a future period, the timing of which is not estimable, the net unrecognized tax benefit of $20,000, excluding interest and penalties, would impact the Company s effective tax rate. The Company accrues interest expense, and if applicable, penalties, for any uncertain tax positions.

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NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

Interest and penalties are classified as a component of income tax expense. As of June 30, 2016 and December 31, 2015, the Company had accrued interest on unrecognized tax benefits of approximately $746 and $157, respectively.

Over the next 12 months it is reasonably possible that the Company may recognize approximately $3,015 of previously net unrecognized tax benefits, excluding interest and penalties, related to various U.S. federal, state and foreign tax positions primarily as a result of the expiration of certain statutes of limitations.

The Company and its subsidiaries are subject to examination by U.S. federal, state and foreign tax authorities. The United States Internal Revenue Service commenced an examination of the Company s U.S. federal tax filings for tax years 2011 through 2013 during the quarter ended March 31, 2015. The audit was effectively settled during the three months ended December 31, 2015 upon the Company s acceptance of the income tax examination changes. As part of the audit, the Company consented to extend the U.S. statute of limitations for tax year 2011 until September 30, 2016.

The U.S. statute of limitations remains open for tax years 2011 through present. The statute of limitations for the Company s tax filings in other jurisdictions varies between fiscal years 2007 through present. The Company also has certain federal credit carry-forwards and state tax loss and credit carry-forwards that are open for examination for tax years 2000 through present.

15) Interest and Other (Expense) Income, Net

	Three Months Ended June 30,		Six Months Ended June 30,	
	2016	2015	2016	2015
Interest and other income	$ 569	$ 828	$ 1,493	$ 1,369
Interest (expense)	(8,474)	(38)	(8,519)	(75)
Impact of foreign exchange income	1,087		1,454	
Interest and other (expense) income, net	$ (6,818)	$ 790	$ (5,572)	$ 1,294

In 2016, the Company reclassified the impact of foreign exchange income (expense) from selling, general and administrative expenses to interest and other (expense) income, net. The amount included in selling, general and administrative expenses for the three and six months ended June 30, 2015 was $(337) of expense and $548 of income, respectively.

16) Net Income Per Share

The following table sets forth the computation of basic and diluted net income per share:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2016	2015	2016	2015
Numerator:				
Net income	$ 9,210	$ 33,220	$ 26,773	$ 67,006
Denominator:				
Shares used in net income per common share basic	53,461,000	53,384,000	53,348,000	53,299,000
Effect of dilutive securities:				
Stock options, restricted stock, stock appreciation rights and employee stock purchase plan	345,000	205,000	337,000	260,000
Shares used in net income per common share diluted	53,806,000	53,589,000	53,685,000	53,559,000
Net income per common share:				
Basic	$ 0.17	$ 0.62	$ 0.50	$ 1.26
Diluted	$ 0.17	$ 0.62	$ 0.50	$ 1.25

Basic earnings per share (EPS) is computed by dividing income available to common stockholders by the weighted-average number of common shares outstanding during the period. The computation of diluted EPS is similar to the computation of basic EPS except that the denominator is increased to include the number of additional common shares that would have been outstanding (using the treasury stock method) if securities containing potentially dilutive common shares (stock options, restricted stock units and stock appreciation rights) had been converted to such common shares, and if such assumed conversion is dilutive.

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NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

17) Stockholder s Equity

Stock Repurchase Program

On July 25, 2011, the Company s Board of Directors approved a share repurchase program for the repurchase of up to an aggregate of $200,000 of its outstanding common stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means. The timing and quantity of any shares repurchased depends upon a variety of factors, including business conditions, stock market conditions, debt agreement limitations and business development activities, including, but not limited to, merger and acquisition opportunities. These repurchases may be commenced, suspended or discontinued at any time without prior notice.

During the six months ended June 30, 2016, the Company repurchased approximately 45,000 shares of its common stock for $1,545, or an average price of $34.50 per share. During the six months ended June 30, 2015, the Company repurchased approximately 116,000 shares of its common stock for $4,341, or an average price of $37.55 per share.

Cash Dividends

Holders of the Company s common stock are entitled to receive dividends when they are declared by the Company s Board of Directors. During the six months ended June 30, 2016, the Company s Board of Directors declared a cash dividend of $0.17 per share in the first and second quarters of 2016, which totaled $18,141. During the six months ended June 30, 2015, the Company s Board of Directors declared a cash dividend of $0.165 per share in the first quarter of 2015 and a cash dividend of $0.17 per share in the second quarter of 2015, which totaled $17,868.

On July 25, 2016, the Company s Board of Directors declared a quarterly cash dividend of $0.17 per share to be paid on September 9, 2016 to shareholders of record as of August 29, 2016. Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of the Company s Board of Directors.

18) Stock-Based Compensation

In connection with the completion of the Newport Merger, the Company assumed:

all restricted stock units (RSUs) granted under any Newport equity plan that were outstanding immediately prior to the effective time of the Newport Merger, and as to which shares of Newport common stock were not fully distributed in connection with the closing of the Newport Merger, and all stock appreciation rights granted under any Newport equity plan, whether vested or unvested, that were outstanding immediately prior to the effective time of the Newport Merger.

As of the effective time of the Newport Merger, based on a formula provided in the Merger Agreement, (a) such RSUs were converted automatically into RSUs with respect to 360,674 shares of the Company s common stock (the Assumed RSUs), and (b) such stock appreciation rights were converted automatically into stock appreciation rights with respect to 899,851 shares of the Company s common stock (the Assumed SARs).

Included in the total number of Assumed RSUs were 36,599 shares for outside directors that were part of the Newport Deferred Compensation plan (the DC Plan), of which 19,137 shares were released from the DC Plan in May 2016. The remaining 17,462 shares will not become issued shares until their respective release dates.

The shares of the Company s common stock that are subject to the Assumed SARs and the Assumed RSUs are issuable pursuant to the Company s 2014 Stock Incentive Plan (the Plan).

The 1,260,525 shares of the Company s common stock that are issuable pursuant to the Assumed RSUs and the Assumed SARs under the Plan were registered under the Securities Act of 1933 on the Registration Statement on Form S-8. These shares are in addition to the 18,000,000 shares of the Company s common stock reserved for issuance under the Plan and previously registered under the Securities Act of 1933 on the Registration Statement on Form S-8.

During the six months ended June 30, 2016, the Company granted 695,284 RSUs with a weighted average grant date fair value of $35.17 and the Company did not grant any stock appreciation rights during the six months ended June 30, 2016.

MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

The total stock-based compensation expense included in the Company s consolidated statements of income and comprehensive income was as follows:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2016	2015	2016	2015
Cost of revenues	$ 890	$ 578	$ 1,330	$ 1,057
Research and development expense	689	428	1,063	850
Selling, general and administrative expense	8,937	2,560	12,275	4,871
Total pre-tax stock-based compensation expense	$ 10,516	$ 3,566	$ 14,668	$ 6,778

At June 30, 2016, the total compensation expense related to unvested stock-based awards granted to employees, officers and directors under the Company s stock based compensation plan that had not been recognized was $33,207, net of estimated forfeitures. The future compensation expense is recognized on a straight-line basis over the requisite service period, net of estimated forfeitures except for retirement eligible employees in which the Company expenses the fair value of the grant in the period the grant is issued. The Company considers many factors when estimating expected forfeitures, including types of awards and historical experience. Actual results, and future changes in estimates, may differ substantially from the Company s current estimates.

The following table presents the activity for RSUs under the Plan:

	Six Months Ended June 30, 2016	
	Non-vested RSUs	Weighted Average Grant Date Fair value
Non-vested RSUs beginning of period	733,162	$ 30.94
Assumed shares from Newport Merger	324,075	35.01
Granted	695,284	35.17
Vested	(429,484)	31.17
Forfeited or expired	(37,585)	32.56
Non-vested RSUs end of period	1,285,452	$ 34.19

For the three and six months ended June 30, 2016, there were approximately 1,000 weighted-average restricted stock units that would have an anti-dilutive effect on EPS, and would thus need to be excluded from the computation of diluted weighted-average shares.

As of June 30, 2015, stock options and restricted stock units related to an aggregate of approximately 772,000 shares were

outstanding. For the three and six months ended June 30, 2015, there were no weighted-average shares of restricted stock units and stock options that were excluded from the computation of diluted weighted-average shares outstanding that would have an anti-dilutive effect on EPS.

At June 30, 2016, the Company s outstanding and exercisable stock appreciation rights, the weighted-average base value, the weighted average remaining contractual life and the aggregate intrinsic value thereof, were as follows:

	Number of shares	Weighted Average Base Value	Weighted Average Remaining Contractual Life (years)	Aggregate Intrinsic Value
Stock appreciation rights outstanding	746,184	$ 27.87	4.3	$ 11,334
Stock appreciation rights exercisable	506,436	$ 26.57	3.7	$ 8,349

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MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

19) Business Segment, Geographic Area, Product and Significant Customer Information

The Company is a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity. The Company also provides services relating to the maintenance and repair of products it sells, software maintenance, installation services and training.

The Company s Chief Operating Decision Maker (CODM) utilizes financial information to make decisions about allocating resources and assessing performance for the entire Company, which is used in the decision making process to assess performance. Based upon the information provided to the CODM, the Company has determined it has two reportable segments.

Effective April 29, 2016, in conjunction with the Newport Merger, the Company changed its reportable segments based upon the organizational structure of the Company and how the CODM utilizes information provided to allocate resources and make decisions. The Company s two reportable segments are the Vacuum & Analysis Division and the Light & Motion Division.

The Vacuum & Analysis Division provides a broad range of instruments, components, subsystems and software which are derived from the Company s core competencies in pressure measurement and control, flow measurement and control, gas and vapor delivery, gas composition analysis, residual gas analysis, leak detection, control and information technology, ozone generation and delivery, RF & DC power, reactive gas generation and vacuum technology.

The Light & Motion Division provides a broad range of instruments, components and subsystems which are derived from the Company s core competencies in lasers, photonics, sub-micron positioning, vibration isolation and optics.

The Company derives its segment results directly from the manner in which results are reported in its management reporting system. The accounting policies that the Company uses to derive reportable segment results are substantially the same as those used for external reporting purposes. The Company does not disclose external or intersegment revenues separately by reportable segment as this information is not presented to the CODM for decision making purposes.

The following is net revenues by reportable segment:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2016	2015	2016	2015
Vacuum & Analysis Division	$ 207,359	$ 217,966	$ 391,040	$ 431,805
Light & Motion Division	118,502		118,502	

	$ 325,861	$ 217,966	$ 509,542	$ 431,805

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MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

The following is a reconciliation of segment gross profit to consolidated net income:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2016	2015	2016	2015
Gross profit by reportable segment:				
Vacuum & Analysis Division	$ 90,859	$ 98,798	$ 168,772	$ 195,844
Light & Motion Division	45,054		45,054	
Total gross profit by reportable segment	135,913	98,798	213,826	195,844
Operating expenses:				
Research and development	28,214	17,567	45,441	34,247
Selling, general and administrative	71,429	33,269	105,379	64,136
Acquisition costs	8,205		10,699	30
Restructuring	24	219	24	1,007
Amortization of intangible assets	8,855	1,709	10,538	3,380
Income from operations	19,186	46,034	41,745	93,044
Interest and other (expense) income, net	(6,818)	790	(5,572)	1,294
Income before income taxes	12,368	46,824	36,173	94,338
Provision for income taxes	3,158	13,604	9,400	27,332
Net income	$ 9,210	$ 33,220	$ 26,773	$ 67,006

The following is capital expenditures by reportable segment for the three and six months ended June 30, 2016 and 2015:

	Vacuum & Analysis Division	Light & Motion Division	Total
Three Months Ended June 30, 2016:			
Capital expenditures	$ 3,036	$ 2,072	$ 5,108
Six Months Ended June 30, 2016:			
Capital expenditures	$ 5,192	$ 2,072	$ 7,264

	Vacuum & Analysis Division	Light & Motion Division	Total
Three Months Ended June 30, 2015:			
Capital expenditures	$ 2,830	$	$ 2,830
Six Months Ended June 30, 2015:			
Capital expenditures	$ 5,334	$	$ 5,334

The following is depreciation and amortization by reportable segment for the three and six months ended June 30, 2016 and 2015:

	Vacuum & Analysis Division	Light & Motion Division	Total
Three Months June 30, 2016:			
Depreciation and amortization	$ 5,209	$ 11,221	$ 16,430
Six Months Ended June 30, 2016:			
Depreciation and amortization	$ 10,487	$ 11,221	$ 21,708

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MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

	Vacuum & Analysis Division	Light & Motion Division	Total
Three Months Ended June 30, 2015:			
Depreciation and amortization	$ 5,550	$	$ 5,550
Six Months Ended June 30, 2015:			
Depreciation and amortization	$ 11,082	$	$ 11,082

Total income tax expense is impracticable to present by reportable segment because the necessary information is not available or used by the CODM.

The following is segment assets by reportable segment:

June 30, 2016:	Vacuum & Analysis Division	Light & Motion Division	Total
Segment assets:			
Accounts receivable	$ 124,629	$ 109,322	$ 233,951
Inventory	155,647	122,713	278,360
Total segment assets	$ 280,276	$ 232,035	$ 512,311

December 31, 2015:	Vacuum & Analysis Division	Light & Motion Division	Total
Segment assets:			
Accounts receivable	$ 101,883	$	$ 101,883
Inventory	152,631		152,631
Total segment assets	$ 254,514	$	$ 254,514

A reconciliation of segment assets to consolidated total assets is as follows:

	June 30, 2016	December 31, 2015
Total segment assets	$ 512,311	$ 254,514
Cash and cash equivalents and investments	440,878	658,237

Other current assets, including restricted cash	63,554	26,760
Property, plant and equipment, net	184,221	68,856
Goodwill and intangible assets, net	1,019,588	243,730
Other assets	24,576	21,250
Consolidated total assets	$ 2,245,128	$ 1,273,347

Goodwill associated with the Company s reportable segments is as follows:

	June 30, 2016	December 31, 2015
Reportable segment:		
Vacuum & Analysis Division	$ 199,903	$ 199,703
Light & Motion Division	392,702	
Total goodwill	$ 592,605	$ 199,703

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MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

Worldwide Product Information

The Company groups its products into six groups of similar products based upon the similarity of product function. Worldwide net revenue for each group of products is as follows:

	Three Months Ended June 30, 2016	Three Months Ended June 30, 2015	Six Months Ended June 30, 2016	Six Months Ended June 30, 2015
Instruments, Control & Vacuum Products	$ 108,172	$ 110,441	$ 202,650	$ 220,877
Power & Reactive Gas Products	83,854	92,977	160,970	181,476
Analytical Solutions Products	15,340	14,548	27,427	29,452
Photonics Products	45,864		45,864	
Optics Products	35,263		35,263	
Lasers Products	37,368		37,368	
	$ 325,861	$ 217,966	$ 509,542	$ 431,805

Sales of Instruments, Control & Vacuum Products, Power & Reactive Gas Products and Analytical Solutions Products are included in the Company s Vacuum & Analysis Division segment. Sales of Photonics Products, Optics Products and Lasers Products are included in the Light & Motion Division segment.

Geographic

Information about the Company s operations in different geographic regions is presented in the tables below. Net revenues to unaffiliated customers are based on the location in which the sale originated. Transfers between geographic areas are at negotiated transfer prices and have been eliminated from consolidated net revenues.

	Three Months Ended June 30, 2016	Three Months Ended June 30, 2015	Six Months Ended June 30, 2016	Six Months Ended June 30, 2015
Net revenues:				
North America	$ 168,471	$ 123,413	$ 262,689	$ 243,594
Korea	26,048	27,349	46,598	59,421
Japan	25,532	17,046	41,768	34,302
Asia (excluding Korea and Japan)	64,891	30,743	98,347	54,426
Europe	40,919	19,415	60,140	40,062
	$ 325,861	$ 217,966	$ 509,542	$ 431,805

	June 30, 2016	December 31, 2015
Long-lived assets:[1]		
North America	$ 128,660	$ 56,594
Europe	31,287	5,783
Asia	49,310	8,952
	$ 209,257	$ 71,329

(1) Long-lived assets include property, plant and equipment, net and certain other long-term assets, excluding long-term tax related accounts.

Major Customers

The Company had two customers with net revenues greater than 10% of total net revenues in the periods shown as follows:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2016	2015	2016	2015
Applied Materials, Inc.	13.5%	18.1%	15.4%	17.8%
LAM Research Corporation	8.9%	13.2%	11.8%	12.7%

MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (continued)

(in thousands, except share and per share data)

20) Commitments and Contingencies

On March 9, 2016, a putative class action lawsuit captioned *Dixon Chung v. Newport Corp., et al*, Case No. A-16-733154-C, was filed in the District Court, Clark County, Nevada on behalf of a putative class of stockholders of Newport for claims related to the Merger Agreement. The complaint, filed on March 9, 2016, named as defendants the Company, Newport, Merger Sub, and certain members of Newport s former board of directors. The complaint alleges that the named directors breached their fiduciary duties to Newport s stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, and by agreeing to unfair deal protection devices. The complaint also alleges that the Company, Newport, and Merger Sub aided and abetted the named directors alleged breaches of their fiduciary duties. The complaint seeks injunctive relief, including to enjoin or rescind the Merger Agreement, monetary damages, and an award of attorneys and other fees and costs, among other relief. On March 25, 2016, the plaintiff in the Chung action filed an amended complaint, which adds certain allegations, including that the preliminary proxy statement filed by Newport on March 15, 2016 (the Proxy) omitted material information. The amended complaint also names as defendants the Company, Newport, Merger Sub, and then-current members of Newport s board of directors.

Also on March 25, 2016, a second putative class action complaint captioned *Hubert C. Pincon v. Newport Corp., et al.*, Case No. A-16-734039-B, was filed in the District Court, Clark County, Nevada, on behalf of a putative class of the Newport s stockholders for claims related to the Merger Agreement. The complaint names as defendants the Company, Newport, and Merger Sub and the then-current members of Newport s former board of directors. It alleges that the named directors breached their fiduciary duties to Newport s stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, by agreeing to unfair deal protection devices, and by omitting material information from the Proxy. The complaint also alleges that the Company, Newport, and Merger Sub aided and abetted the named directors alleged breaches of their fiduciary duties. The complaint seeks injunctive relief, including to enjoin or rescind the Merger Agreement, and an award of attorneys and other fees and costs, among other relief.

On April 14, 2016, the Court granted plaintiffs motion to consolidate the Pincon and Chung actions and appointed counsel in the Pincon action as lead counsel. Also on April 14, 2016, the Court granted plaintiffs motion for expedited discovery and scheduled a hearing on plaintiffs anticipated motion for a preliminary injunction for April 25, 2016. On April 20, 2016, plaintiffs filed a motion to vacate the hearing on their anticipated motion for a preliminary injunction and notified the Court that they did not presently intend to file a motion for a preliminary injunction regarding the Merger Agreement. On April 22, 2016, the Court vacated the hearing on plaintiffs anticipated motion for a preliminary injunction.

The Company believes that the claims asserted in the complaints have no merit and the Company, Newport, Merger Sub and the named directors intend to defend vigorously against these claims.

We are also subject to various other legal proceedings and claims, which have arisen in the ordinary course of business. In our opinion, the ultimate disposition of these matters will not have a material adverse effect on our results of operations, financial condition or cash flows.

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ITEM 2. MANAGEMENT S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS.

This Quarterly Report on Form 10-Q contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act and Section 21E of the Securities Exchange Act of 1934, as amended (the Exchange Act). When used herein, the words believes, anticipates, plans, expects, estim would, will, intends and similar expressions are intended to identify forward-looking statements. These forward-looking statements reflect management s current opinions and are subject to certain risks and uncertainties that could cause results to differ materially from those stated or implied. While we may elect to update forward looking statements in the future, we specifically disclaim any obligation to do so even if our estimates or expectations change. Risks and uncertainties include, but are not limited to those discussed in Part II, Item 1A Risk Factors of this Quarterly Report on Form 10-Q.

Overview

We are a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity. We also provide services relating to the maintenance and repair of our products, software maintenance, installation services and training.

Our products are derived from our core competencies in pressure measurement and control, flow measurement and control, gas and vapor delivery, gas composition analysis, residual gas analysis, leak detection, control and information technology, ozone generation and delivery, RF & DC power, reactive gas generation, vacuum technology, lasers, photonics, sub-micron positioning, vibration isolation and optics. Our primary served markets include semiconductor capital equipment, general industrial, life sciences and research.

Acquisition of Newport Corporation

On April 29, 2016, we completed our acquisition of Newport Corporation (Newport) pursuant to an Agreement and Plan of Merger dated as of February 22, 2016 (the Newport Merger). At the effective time of the Newport Merger, each share of Newport s common stock issued and outstanding as of immediately prior to the effective time of the Newport Merger was converted into the right to receive $23.00 in cash, without interest and subject to deduction for any required withholding tax. We paid to the former Newport stockholders aggregate consideration of approximately $905 million, excluding related transaction fees and expenses, and repaid approximately $93 million of Newport s U.S. indebtedness outstanding as of immediately prior to the effective time of the Newport Merger. We funded the payment of the aggregate consideration with a combination of our available cash on hand of approximately $240 million and the proceeds from the senior secured term loan facility of $780 million described below.

Newport is a global supplier of advanced-technology products and systems to customers in the scientific research and defense/security, microelectronics, life and health sciences and industrial manufacturing markets.

Effective April 29, 2016, in conjunction with our acquisition of Newport, we changed the structure of our reportable segments based upon our organizational structure and how our Chief Operating Decision Maker utilizes information provided to allocate resources and make decisions. Our two reportable segments are the Vacuum & Analysis Division and the Light & Motion Division.

The Vacuum & Analysis Division provides a broad range of instruments, components, subsystems and software which are derived from our core competencies in pressure measurement and control, flow measurement and control, gas and vapor delivery, gas composition analysis, residual gas analysis, leak detection, control and information technology, ozone generation and delivery, RF & DC power, reactive gas generation and vacuum technology.

The Light & Motion Division provides a broad range of instruments, components and subsystems which are derived from our core competencies in lasers, photonics, sub-micron positioning, vibration isolation and optics.

For the six months ended June 30, 2016 and 2015, approximately 61% and 71% of our net revenues, respectively, were from sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers. As a result of our acquisition of Newport, we expect that sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers will account for approximately 50% of our total sales in future periods.

Net revenues from semiconductor capital equipment manufacture and semiconductor device manufacture customers increased by 13% and 1% for the three and six months ended June 30, 2016, compared to the same periods in the prior year. These increases are primarily attributed to net semiconductor revenues from the Newport Merger of $27.2 million for the three and six months ended June 30, 2016. These increases for the three and six months ended June 30, 2016 are offset by decreases in net revenues from our semiconductor capital

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equipment manufacture and semiconductor device manufacture customers, from the legacy MKS business of $7.1 million and $23.5 million for the three and six months ended June 30, 2016, respectively. The semiconductor capital equipment industry is subject to rapid demand shifts, which are difficult to predict, and we are uncertain as to the timing or extent of future demand or any future weakness in the semiconductor capital equipment industry.

Our net revenues from customers in other advanced markets, which exclude semiconductor capital equipment and semiconductor device manufacture customers, increased by 138% and 59% for the three and six months ended June 30, 2016, compared to the same periods in the prior year. These increases are primarily attributed to net revenues from customers in other advanced markets resulting from the Newport Merger of $91.3 million for the three and six months ended June 30, 2016. These increases are offset by decreases in net revenues from customers in other advanced markets from the legacy MKS business of $3.5 million and $17.2 million for the three and six months ended June 30, 2016, respectively. Revenues from customers in other advanced markets are made up of many different markets, including semiconductor capital equipment, general industrial, life sciences and research. Some of these markets are project-based and our revenues can fluctuate quarter to quarter.

A significant portion of our net revenues is from sales to customers in international markets. For the six months ended June 30, 2016 and 2015, international net revenues accounted for approximately 48% and 44% of our total net revenues, respectively. A significant portion of our international net revenues were in Korea, Japan and Israel. As a result of our Newport Merger, we expect that international net revenues will continue to represent a significant percentage of our total net revenues.

Recent Events

In connection with the completion of the Newport Merger, we entered into a term loan credit agreement (the Credit Agreement) with Barclays Bank PLC as administrative agent and collateral agent, that provided senior secured financing of $780 million, subject to increase in accordance with the terms of the Credit Agreement.

In June 2016, we entered into an amendment to the Credit Agreement (the Repricing Amendment) where we decreased the applicable margin for borrowings by 0.50%. In connection with the Repricing Amendment we paid a prepayment premium of 1.0% or $7.3 million, as well as certain fees and expenses. Immediately prior to the effectiveness of the Repricing Amendment, we prepaid $50 million of principal under the Credit Agreement, reducing the outstanding principal balance from $780 million to $730 million.

In connection with the completion of the Newport Merger, we also entered into an asset-based credit agreement with Deutsche Bank AG New York Branch as administrative agent and collateral agent, that provides senior secured financing of up to $50 million, subject to a borrowing base limitation, none of which has been drawn down to date.

Critical Accounting Policies and Estimates

The preparation of our consolidated financial statements and related disclosures in conformity with accounting principles generally accepted in the United States of America requires management to make judgments, assumptions and estimates that affect the amounts reported. There have been no material changes in our critical accounting policies since December 31, 2015. For further information, please see the discussion of critical accounting policies in our Annual Report on Form 10-K for the year ended December 31, 2015 in the section captioned Management s Discussion and Analysis of Financial Condition and Results of Operations Critical Accounting Policies and Estimates.

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Results of Operations

The following table sets forth, for the periods indicated, the percentage of total net revenues of certain line items included in our consolidated statements of operations and comprehensive income data.

	Three Months Ended June 30,		Six Months Ended June 30,	
	2016	2015	2016	2015
Net revenues:				
Product	87.6%	86.4%	86.2%	86.7%
Services	12.4	13.6	13.8	13.3
Total net revenues	100.0	100.0	100.0	100.0
Cost of revenues:				
Cost of product revenues	50.3	45.8	48.9	46.0
Cost of service revenues	8.0	8.9	9.1	8.7
Total cost of revenues (exclusive of amortization shown separately below)	58.3	54.7	58.0	54.7
Gross profit	41.7	45.3	42.0	45.3
Research and development	8.7	8.0	8.9	7.9
Selling, general and administrative	21.9	15.3	20.7	14.9
Acquisition costs	2.5		2.1	
Restructuring		0.1		0.2
Amortization of intangible assets	2.7	0.8	2.1	0.8
Income from operations	5.9	21.1	8.2	21.5
Interest (expense) income, net	(2.1)	0.3	(1.1)	0.3
Income from operations before income taxes	3.8	21.4	7.1	21.8
Provision for income taxes	1.0	6.2	1.8	6.3
Net income	2.8%	15.2%	5.3%	15.5%

Net Revenues

	Three Months Ended June 30,			Six Months Ended June 30,		
(dollars in millions)	2016	2015	% Change	2016	2015	% Change
Product	$ 285.5	$ 188.3	51.6%	$ 439.1	$ 374.4	17.3%
Service	40.4	29.7	36.1	70.4	57.4	22.7
Total net revenues	$ 325.9	$ 218.0	49.5%	$ 509.5	$ 431.8	18.0%

Product revenues increased $97.2 million and $64.7 million during the three and six months ended June 30, 2016, respectively, compared to the same periods in the prior year. These increases were primarily attributed to the Newport Merger, which had product revenues of $109.6 million for the three and six months ended June 30, 2016. This was partially offset by decreases of $12.4 million and $44.9 million for the three and six months ended June 30, 2016, respectively, in our legacy MKS business, mainly as a result of a decrease in net revenues from our semiconductor capital equipment manufacture and semiconductor device manufacture customers, which decreased $7.1 million and $23.5 million for the three and six months ended June 30, 2016, respectively, primarily due to volume.

Service revenues consisted mainly of fees for services related to the maintenance and repair of our products and software services, installation and training. Service revenues increased $10.7 million and $13.0 million during the three and six months ended June 30, 2016, respectively, compared to the same periods in the prior year. These increases for the three and six months ended June 30, 2016, compared to the same periods in the prior year, were primarily attributable to the Newport Merger which had service revenues of $8.9 million for the three and six months ended June 30, 2016.

Total international net revenues, including product and service, were $157.4 million and $246.9 million for the three and six months ended June 30, 2016, respectively, compared to $94.6 million and $188.2 million for the three and six months ended June 30, 2015, respectively. These increases of $62.8 million and $58.7 million for the three and six months ended June 30, 2016, compared to the same periods in the prior year, was primarily attributable to the Newport Merger, which had total international net revenues, of $50.4 million for the three and six months ended June 30, 2016.

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The following is our net revenues by reportable segment:

(*dollars in millions*)	Three Months Ended June 30, 2016	2015	% Change	Six Months Ended June 30, 2016	2015	% Change
Net revenues:						
Vacuum & Analysis Division	$ 207.4	$ 218.0	(4.9)%	$ 391.0	$ 431.8	(9.4)%
Light & Motion Division	118.5		100.0	118.5		100.0
Total net revenues	$ 325.9	$ 218.0	49.5%	$ 509.5	$ 431.8	18.0%

Net revenues for our Vacuum & Analysis Division segment decreased $10.6 million and $40.8 million for the three and six months ended June 30, 2016, respectively. This segment represents the legacy MKS business. These decreases are primarily attributed to a decrease of $7.1 million and $23.5 million in net revenues from our semiconductor capital equipment manufacture and semiconductor device manufacture customers for the three and six months ended June 30, 2016, respectively. The remainder of the decreases for the three and six months ended June 30, 2016 are attributable to decreases in revenues from our other advanced markets, including general industrial, medical and solar markets.

Net revenues for our Light & Motion Division segment increased $118.5 million for the three and six months ended June 30, 2016. This segment represents the legacy Newport business.

Gross Profit

	Three Months Ended June 30, 2016	2015	% Points Change	Six Months Ended June 30, 2016	2015	% Points Change
Gross profit as a percentage of net revenues:						
Product	42.6%	47.0%	(4.4)%	43.2%	47.0%	(3.8)%
Service	35.7	34.9	0.8	34.2	34.8	(0.6)
Total gross profit	41.7%	45.3%	(3.6)%	42.0%	45.3%	(3.3)%

Gross profit as a percentage of net product revenues decreased by 4.4 percentage points for the three months ended June 30, 2016, compared to the same period in the prior year. The decrease was primarily attributed to a decrease of 7.5 percentage points due to higher material costs, mainly from the $10.1 million of inventory step-up amortization from the Newport Merger, partially offset by an increase of 4.0 percentage points from higher revenue volumes.

Gross profit as a percentage of net product revenues decreased by 3.8 percentage points for the six months ended June 30, 2016, compared to the same period in the prior year. The decrease was primarily attributed to a decrease of 4.3 percentage points due to higher material costs, mainly from the $10.1 million of inventory step-up amortization from the Newport Merger.

Gross profit as a percentage of net service revenues increased by 0.8 percentage points for the three months ended June 30, 2016, compared to the same period in the prior year. The increase was primarily attributed to an increase of 1.9 percentage points due to lower direct labor costs, partially offset by a decrease of 1.2 percentage points due to unfavorable product mix. Cost of service revenues, including salaries and related expenses and other fixed costs, consists primarily of providing services for repair, software services and training.

Gross profit as a percentage of net service revenues decreased by 0.6 percentage points for the six months ended June 30, 2016, compared to the same period in the prior year. The decrease was primarily attributed to a decrease of 3.1 percentage points due to unfavorable product mix, partially offset by an increase of 2.3 percentage points due to lower overhead costs.

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The following is gross profit as a percentage of net revenues by reportable segment:

	Three Months Ended June 30,			Six Months Ended June 30,		
	2016	2015	% Points Change	2016	2015	% Points Change
Gross profit:						
Vacuum & Analysis Division	43.8%	45.3	(1.5)%	43.2%	45.3%	(2.1)%
Light & Motion Division	38.0		100.0	38.0		100.0
Total gross profit	41.7%	45.3%	(3.6)%	42.0%	45.3%	(3.3)%

Gross profit for our Vacuum & Analysis Division segment decreased by 1.5 percentage points and 2.1 percentage points for the three and six months ended June 30, 2016, respectively, compared to the same periods in the prior year. These decreases were caused mainly by negative product mix, lower revenue volumes and higher excess and obsolete inventory charges. The higher excess and obsolete inventory charges related to a large sell through credit of $2.1 million that occurred in the second quarter of 2015.

Gross profit for our Light & Motion Division segment was 38% of net revenues for the three and six months ended June 30, 2016. This included a charge of $10.1 million of inventory step-up amortization related to the acquisition. The Light & Motion Division segment was established in the second quarter of 2016 as a result of the Newport Merger.

Research and Development

(dollars in millions)	Three Months Ended June 30, 2016	2015	Six Months Ended June 30, 2016	2015
Research and development expenses	$ 28.2	$ 17.6	$ 45.4	$ 34.2

Research and development expenses increased $10.6 million for the three months ended June 30, 2016, compared to the same period in the prior year. The increase was primarily attributed to an increase of $10.0 million from our Newport Merger in the second quarter of 2016, and consisted mainly of $7.5 million of compensation and related benefits, $0.9 million of project materials and $0.8 million of occupancy costs.

Research and development expenses increased $11.2 million for the six months ended June 30, 2016, compared to the same period in the prior year. The increase was primarily attributed to an increase of $10.0 million from our Newport Merger in the second quarter of 2016, and consisted mainly of $7.5 million of compensation costs and related benefits, $0.9 million of project materials and $0.8 million of occupancy costs.

Our research and development efforts are primarily focused on developing and improving our instruments, components, subsystems and process control solutions to improve process performance and productivity.

We have thousands of products and our research and development efforts primarily consist of a large number of projects related to these products, none of which is individually material to us. Current projects typically have durations of 3 to 30 months depending upon whether the product is an enhancement of existing technology or a new product. Our current initiatives include projects to enhance the performance characteristics of older products, to develop new products and to integrate various technologies into subsystems. These projects support in large part the transition in the semiconductor industry to smaller integrated circuit geometries and in the flat panel display and solar markets to larger substrate sizes, which require more advanced process control technology. Research and development expenses consist primarily of salaries and related expenses for personnel engaged in research and development, fees paid to consultants, material costs for prototypes and other expenses related to the design, development, testing and enhancement of our products.

We believe that the continued investment in research and development and ongoing development of new products are essential to the expansion of our markets, and we expect to continue to make significant investment in research and development activities. We are subject to risks if products are not developed in a timely manner, due to rapidly changing customer requirements and competitive threats from other companies and technologies. Our success primarily depends on our products being designed into new generations of equipment for the semiconductor industry and other advanced technology markets. We develop products that are technologically advanced so that they are positioned to be chosen for use in each successive generation of semiconductor capital equipment. If our products are not chosen to be designed into our customers   products, our net revenues may be reduced during the lifespan of those products.

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Selling, General and Administrative

(dollars in millions)	Three Months Ended June 30, 2016	Three Months Ended June 30, 2015	Six Months Ended June 30, 2016	Six Months Ended June 30, 2015
Selling, general and administrative expenses	$ 71.4	$ 33.3	$ 105.4	$ 64.1

Selling, general and administrative expenses increased by $38.1 million for the three months ended June 30, 2016, compared to the same period in the prior year. The increase was primarily attributable to an increase of $33.9 million from our Newport Merger, and consisted primarily of $14.8 million of compensation costs and related benefits, $10.3 million of integration costs related to the acquisition, $2.3 million of consulting and professional fees, $1.5 million of commissions and $1.5 million of depreciation. The remaining increase of $4.2 million relates primarily to the legacy MKS business and consists of $2.7 million of compensation-related expenses, including the timing of stock compensation expense as well as the annual increase in certain compensation costs, and $1.6 million of integration costs.

Selling, general and administrative expenses increased by $41.3 million for the six months ended June 30, 2016, compared to the same period in the prior year. The increase was primarily attributed to an increase of $33.9 million from our Newport Merger, and consisted primarily of $14.8 million of compensation costs and related benefits, $10.3 million of integration costs related to the acquisition, $2.3 million of consulting and professional fees, $1.5 million of commissions and $1.5 million of depreciation. The remaining increase of $7.4 million relates primarily to the legacy MKS business and consists of $4.9 million of compensation-related expenses, including the timing of stock compensation expense as well as the annual increase in certain compensation costs, and $1.6 million of integration costs.

Acquisition Costs

(dollars in millions)	Three Months Ended June 30, 2016	Three Months Ended June 30, 2015	Six Months Ended June 30, 2016	Six Months Ended June 30, 2015
Acquisition costs	$ 8.2	$	$ 10.7	$

We incurred $8.2 million and $10.7 million of acquisition costs in the three and six months ended June 30, 2016, respectively, related to our Newport Merger and was comprised mainly of bank fees and consulting and professional fees. We incurred $30 thousand of acquisition costs in the six months ended June 30, 2015, which was comprised primarily of legal fees related to our acquisition of Precisive, LLC (Precisive), which closed during the first quarter of 2016.

Restructuring

(dollars in millions)	Three Months Ended June 30, 2016	Three Months Ended June 30, 2015	Six Months Ended June 30, 2016	Six Months Ended June 30, 2015
Restructuring	$	$ 0.2	$	$ 1.0

Restructuring expense for the three and six months ended June 30, 2015 included restructuring charges primarily related to severance costs associated with a reduction in workforce of approximately 120 people, primarily at one of our foreign manufacturing sites, as we outsourced a non-core manufacturing process.

Amortization of Intangible Assets

	Three Months Ended June 30,		Six Months Ended June 30,	
(dollars in millions)	2016	2015	2016	2015
Amortization of intangible assets	$ 8.9	$ 1.7	$ 10.5	$ 3.4

Amortization expense increased by $7.2 million and $7.1 million for the three and six months ended June 30, 2016. These increases were primarily attributable to $7.2 million of amortization expense of intangible assets acquired through the Newport Merger. The remainder of the change is attributable to amortization of intangible assets from the Precisive acquisition and changes in foreign exchange rates.

Interest and Other (Expense) Income, Net

	Three Months Ended June 30,		Six Months Ended June 30,	
(dollars in millions)	2016	2015	2016	2015
Interest and other (expense) income, net	$ (6.8)	$ 0.8	$ (5.6)	$ 1.3

Interest and other (expense) income of $(6.8) million and $(5.6) million for the three and six months ended June 30, 2016, respectively, includes $8.5 million of interest expense recognized for the three and six months ended June 30, 2016, related to our senior secured Term Loan Facility.

Provision for Income Taxes

	Three Months Ended June 30,		Six Months Ended June 30,	
(dollars in millions)	2016	2015	2016	2015
Provision for income taxes	$ 3.2	$ 13.6	$ 9.4	$ 27.3

Our effective tax rate for the three and six months ended June 30, 2016 was 25.5% and 26.0%, respectively. The effective tax rate for the three and six months ended June 30, 2016 was lower than the U.S. statutory tax rate primarily due to the geographic mix of income and profits earned by the Company s international subsidiaries being taxed at rates lower than the U.S. statutory tax rate, the federal research credit and the deduction for domestic production activities offset by non-deductible acquisition related costs and state income taxes. During the three and six months ended June 30, 2016, the geographic mix of our pre-tax income was impacted by additional acquisition related costs associated with the Newport Merger, amortization of intangibles, reversal of other purchase accounting related charges and interest expense primarily located in the U.S. tax jurisdiction. The acquisition-related costs are treated as expenses in the financial reports but are largely capitalized for tax purposes. This reduction in overall taxable income as a result of the Newport Merger causing the reduction in US pre-tax income relative to the pre-tax income earned by our international subsidiaries served to reduce the overall effective tax rate. These effects of the acquisition on the tax rate are expected to diminish in future periods. Our effective tax rate for the three and six months ended June 30, 2015 was 29.1% and 29.0%, respectively. The effective tax rate for the three and six months ended June 30, 2015 was lower than the U.S. statutory tax rate primarily due to the geographic mix of income and profits earned by the Company s international subsidiaries being taxed at rates lower than the U.S. statutory tax rate and the impact of the deduction for domestic production activities.

Our future effective tax rate depends on various factors, including the impact of tax legislation, the geographic composition of our pre-tax income, and changes in tax reserves for unrecognized tax benefits. We monitor these factors and timely adjust our estimates of the effective tax rate accordingly. We expect that the geographic mix of pre-tax income will continue to have a favorable impact on our effective tax rate, however the geographic mix of pre-tax income can change based on multiple factors resulting in changes to the effective tax rate in future periods.

Additionally, the effective tax rate could be adversely affected by changes in the valuation of deferred tax assets and liabilities. In particular, the carrying value of deferred tax assets, which are predominantly in the United States, is dependent on our ability to generate sufficient future taxable income in the United States.

While we believe we have adequately provided for all tax positions, amounts asserted by taxing authorities could materially differ from our accrued positions as a result of uncertain and complex application of tax law and regulations. We and our subsidiaries are subject to examination by U.S. federal, state and foreign tax authorities. The United States Internal Revenue Service commenced an examination of our U.S. federal tax filings for open tax years 2011 through 2013 during the three months ended March 31, 2015. This audit was effectively settled during the three months ended December 31, 2015 upon our acceptance of the income tax examination changes. Additionally, the recognition and measurement of certain tax benefits include estimates and judgment by management. Accordingly, we could record additional provisions or benefits for U.S. federal, state, and foreign taxes matters in future periods as new information becomes available.

Liquidity and Capital Resources

Cash and cash equivalents and short-term investments totaled $425.6 million at June 30, 2016, compared to $658.2 million at December 31, 2015.

Net cash provided by operating activities was $49.4 million for the six months ended June 30, 2016 and resulted from net income of $26.8 million, which included non-cash charges of $54.3 million, offset by a net increase in working capital of $31.7 million. The net increase in working capital was primarily due to an increase in trade accounts receivable of $35.9 million, related to an increase in business activities, and an increase in other current assets and non-current assets of $13.0 million. These increases in working capital were offset by an increase in accounts payable of $7.4 million, an increase in income taxes of $6.4 million and a decrease in inventories of $3.9 million.

Net cash provided by operating activities was $58.2 million for the six months ended June 30, 2015 and resulted mainly from net income of $67.0 million, which included non-cash charges of $23.8 million, partially offset by a net increase in working capital of $32.6 million. The net increase in working capital was primarily due to an increase in trade accounts receivable of $18.8 million and an increase in inventories of $18.5 million, both related to an increase in business activities, an increase in other current assets of $6.0 million and a decrease in accrued compensation of $2.4 million. These increases in working capital were offset by an increase in other current and non-current liabilities of $6.9 million and an increase in income taxes of $6.4 million.

Net cash used in investing activities was $595.6 million for the six months ended June 30, 2016 and resulted primarily from the Newport Merger for $937.0 million and the purchase of production-related equipment of $7.3 million, partially offset by the net sale and maturities of investments of $351.3 million, which was used to partially finance the Newport Merger. Net cash used in investing

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activities of $162.7 million for the six months ended June 30, 2015 resulted primarily from the net purchase of investments of $147.5 million, cash primarily used for the acquisition of Precisive of $9.9 million and the purchase of production-related equipment of $5.3 million.

Net cash provided by financing activities was $677.0 million for the six months ended June 30, 2016 and resulted primarily from net proceeds of $703.6 million related to the Credit Agreement used to finance the Newport Merger, partially offset by dividend payments made to common stockholders of $18.1 million, restricted cash of $5.6 million for collateral cash deposits relating to letters of credit and net payments related to tax payments made for employee stock awards of $2.9 million.

Net cash used in financing activities was $22.5 million for the six months ended June 30, 2015 and consisted primarily of dividend payments made to common stockholders of $17.9 million, the repurchase of common stock for $4.3 million and net payments related to tax payments made for employee stock awards of $1.1 million.

On July 25, 2011, our Board of Directors approved a share repurchase program for the repurchase of up to an aggregate of $200 million of our outstanding common stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means. The timing and quantity of any shares repurchased depends upon a variety of factors, including business conditions, stock market conditions and business development activities, including but not limited to merger and acquisition opportunities. These repurchases may be commenced, suspended or discontinued at any time without prior notice.

During the six months ended June 30, 2016, we repurchased approximately 45,000 shares of our common stock for $1.5 million, or an average price of $34.50 per share. During the six months ended June 30, 2015, we repurchased approximately 116,000 shares of our common stock for $4.3 million, or an average price of $37.55 per share.

During the six months ended June 30, 2016, our Board of Directors declared a cash dividend of $0.17 per share during the first and second quarters of 2016 that totaled $18.1 million. During the six months ended June 30, 2015, our Board of Directors declared a cash dividend of $0.165 per share during the first quarter of 2015 and a cash dividend of $0.17 per share during the second quarter of 2015, which totaled $17.9 million.

On July 25, 2016, our Board of Directors declared a quarterly cash dividend of $0.17 per share to be paid on September 9, 2016 to shareholders of record as of August 29, 2016. Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of our Board of Directors. In addition, under the terms of our senior secured term loan facility and our senior secured asset-based revolving credit facility, we may be restricted from paying dividends under certain circumstances.

On April 27, 2016, we invested $9.3 million for a minority interest in Reno Sub-Systems, Inc., a Delaware corporation, which operates in the field of semiconductor process equipment instrumentation. We accounted for this investment using the cost method of accounting.

Acquisition of Newport Corporation

On April 29, 2016, we completed the Newport Merger. At the effective time of the Newport Merger and pursuant to the terms and conditions of the Newport Merger Agreement, each share of Newport s common stock issued and outstanding as of immediately prior to the effective time of the Newport Merger was converted into the right to receive $23.00 in cash, without interest and subject to deduction for any required withholding tax. We paid to the former Newport stockholders aggregate consideration of approximately $905 million, excluding related transaction fees and expenses and repaid approximately $93 million of Newport s U.S. indebtedness outstanding as of immediately prior to the effective time of the Newport Merger. We funded the payment of the aggregate consideration with a combination of our available cash on hand of approximately $240 million and the proceeds from the senior secured term loan facility of $780 million described below.

Term Loan Credit Agreement

In connection with the completion of the Newport Merger, we entered into the Credit Agreement with Barclays Bank PLC, as administrative agent and collateral agent, and the Lenders, that provided senior secured financing of $780 million, subject to increase in accordance with the Credit Agreement (the Term Loan Facility). Borrowings under the Term Loan Facility bear interest per annum at one of the following rates selected by us: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the prime rate quoted in The Wall Street Journal, (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month adjusted for certain additional costs, plus 1.00%, and (4) a floor of 1.75%, plus, in each case, an applicable margin of 3.00%; or (b) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the interest period relevant to such borrowing adjusted for certain additional costs, subject to a LIBOR rate floor of 0.75%, plus an applicable margin of 4.00%. The Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

On June 9, 2016, we entered into the Repricing Amendment to the Credit Agreement, dated as of April 29, 2016, by and among us, the Lenders, and Barclays Bank PLC, as administrative agent and collateral agent for the Lenders. The Repricing Amendment decreased the applicable margin for borrowings under our Term Loan Facility to 2.50% for base rate borrowings and 3.50% for LIBOR borrowings and extended the period during which a prepayment premium may be required for a Repricing Transaction (as defined in the Credit Agreement) until six months after the effective date of the Repricing Amendment. In connection with the execution of the Repricing Amendment, we paid a prepayment premium of 1.00%, or $7.3 million, as well as certain fees and expenses of the administrative agent and the Lenders, in accordance with the terms of the Credit Agreement. Immediately prior to the effectiveness of the Repricing Amendment, we prepaid $50 million of principal under the Credit Agreement, reducing the outstanding principal under the Credit Agreement from $780 million to $730 million.

Under the Credit Agreement, we are required to prepay outstanding term loans, subject to certain exceptions, with portions of its annual excess cash flow as well as with the net cash proceeds of certain asset sales, certain casualty and condemnation events and the incurrence or issuance of certain debt. We are also required to make scheduled quarterly payments each equal to 0.25% of the original principal amount of the term loans made on the closing date with such original principal amount reduced by any prepayments (such as the $50 million prepaid to date), with the balance due on the seventh anniversary of the closing date.

All obligations under the Term Loan Facility are guaranteed by certain of our domestic subsidiaries, and are secured by substantially all of our assets and the assets of such subsidiaries, subject to certain exceptions and exclusions.

The Credit Agreement contains customary representations and warranties, affirmative and negative covenants and provisions relating to events of default. If an event of default occurs, the Lenders under the Term Loan Facility will be entitled to take various actions, including the acceleration of amounts due under the Term Loan Facility and all actions permitted to be taken by a secured creditor.

Senior Secured Asset-Based Revolving Credit Facility

In connection with our completion of the Newport Merger, we also entered into an asset-based credit agreement with Deutsche Bank AG New York Branch, as administrative agent and collateral agent, the other borrowers from time to time party thereto, and the lenders and letters of credit issuers from time to time party thereto (the ABL Facility), that provides senior secured financing of up to $50 million, subject to a borrowing base limitation. The borrowing base for the ABL Facility at any time equals the sum of: (a) 85% of certain eligible accounts; plus (b) subject to certain notice and field examination and appraisal requirements, the lesser of (i) the lesser of (A) 65% of the lower of cost or market value of certain eligible inventory and (B) 85% of the net orderly liquidation value of certain eligible inventory and (ii) 30% of the borrowing base; minus (c) reserves established by the administrative agent; provided that until the administrative agent s receipt of a field examination of accounts receivable the borrowing base shall be equal to 70% of the book value of certain eligible accounts. The ABL Facility includes borrowing capacity in the form of letters of credit up to $15 million. We have not drawn against the ABL Facility.

Borrowings under the ABL Facility bear interest per annum at one of the following rates selected by us: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the prime rate quoted in The Wall Street Journal, and (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month adjusted for certain additional costs, plus 1.00%, plus, in each case, an initial applicable margin of 0.75%; and (b) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the interest period relevant to such borrowing adjusted for certain additional costs, plus an initial applicable margin of 1.75%. Commencing with the completion of the first fiscal quarter ending after the closing of the ABL Facility, the applicable margin for borrowings thereunder is subject to upward or downward adjustment each fiscal quarter, based on the average historical excess availability during the preceding quarter.

In addition to paying interest on outstanding principal under the ABL Facility, we are required to pay a commitment fee in respect of the unutilized commitments thereunder. The initial commitment fee is 0.375% per annum. Commencing with the completion of the first fiscal quarter ending after the closing of the ABL Facility, the commitment fee is subject to downward adjustment based on the amount of average unutilized commitments for the three-month period immediately preceding such adjustment date. We must also pay customary letter of credit fees and agency fees.

Lines of Credit and Short-Term Borrowing Arrangements

One of our Japanese subsidiaries has lines of credit and short-term borrowing arrangements with two financial institutions which arrangements generally expire and are renewed at three-month intervals. The lines of credit provided for aggregate borrowings as of June 30, 2016 of up to an equivalent of $22.4 million U.S. dollars. One of the borrowing arrangements has an interest rate based on the Tokyo Interbank Offer Rate at the time of borrowing and the other has an interest rate based on the Japanese Short-term Prime Lending Rate. There were no borrowings outstanding under these arrangements at June 30, 2016 and December 31, 2015.

We assumed various revolving lines of credit and a financing facility with the completion of the Newport Merger. These revolving lines of credit and financing facility have no expiration date and provided for aggregate borrowings as of June 30, 2016 of up to an equivalent of $9.7 million U.S. dollars. Both revolving lines of credit have a base interest rate of 1.25% plus a Japanese Yen overnight LIBOR rate.

One of our Austrian subsidiaries has four outstanding loans from the Austrian government to fund research and development. These loans are unsecured and do not require principal repayment as long as certain conditions are met. Interest on these loans is payable semi-annually. The interest rates associated with these loans range from 0.75%-2.00%.

Our total cash and cash equivalents and short-term marketable investments at June 30, 2016 consisted of $73.7 million held in the United States and $351.9 million held by our foreign subsidiaries, substantially all of which would be subject to tax in the United States if returned to the United States. We believe our existing United States cash and short-term investment balances and ability to borrow against our ABL Facility are adequate for us to meet domestic operating needs, including estimated working capital, planned capital expenditure requirements and any future cash dividends, if declared, during the next twelve months and the foreseeable future.

Off-Balance Sheet Arrangements

We do not have any financial partnerships with unconsolidated entities, such as entities often referred to as structured finance, special purpose entities or variable interest entities, which are often established for the purpose of facilitating off-balance sheet arrangements or for other contractually narrow or limited purposes. Accordingly, we have no off-balance sheet arrangements that have or are reasonably expected to have a current or future effect on our financial condition, results of operations, liquidity, capital expenditures or capital resources that are material to investors.

Contractual Obligations

In connection with the Newport Merger, in addition to debt obligations and pension obligations as described within this document, we have also assumed contractual capital and operating lease obligations and purchase obligations.

Recently Issued Accounting Pronouncements

In January 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-01, Financial Instruments Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities. This ASU provides guidance for the recognition, measurement, presentation, and disclosure of financial instruments. The new pronouncement revises accounting related to equity investments and the presentation of certain fair value changes for financial assets and liabilities measured at fair value. Among other things, it amends the presentation and disclosure requirements of equity securities that do not result in consolidation and are not accounted for under the equity method. Changes in the fair value of these equity securities will be recognized directly in net income. This pronouncement is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. We do not expect adoption of this ASU to have a material impact on our consolidated statements of financial position and results of operations.

In March 2016, the FASB issued ASU 2016-09 Compensation - Stock Compensation (Topic 718) Improvements to Employee Share-Based Payment Accounting. This standard simplifies several aspects of the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The provisions of this ASU are effective for annual periods beginning after December 15, 2016, including interim periods within those fiscal years and early adoption is permitted. We are currently evaluating the requirements of this ASU and have not yet determined its impact on our consolidated financial statements.

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842). This standard requires the recognition of lease assets and liabilities for all leases, with certain exceptions, on the balance sheet. In transition, lessees and lessors are required to recognize and measure leases at the beginning of the earliest period presented using a modified retrospective approach. This ASU is effective for annual periods beginning after December 15, 2018, including interim periods within those fiscal years. We are currently evaluating the requirements of this ASU and have not yet determined its impact on our consolidated financial statements.

In July 2015, the FASB issued ASU 2015-11, Inventory (Topic 330) Simplifying the Measurement of Inventory. The amendments in this ASU apply to all inventory that is measured using first-in, first-out or average cost. This standard requires that an entity measure inventory within the scope of this update at the lower of cost and net realizable value. Net realizable value is the estimated selling prices in the ordinary course of business, less reasonably predictable costs of completion, disposal, and transportation. The amendments in this ASU are effective for annual periods beginning after December 15, 2016, including interim periods within those fiscal years. We do not expect adoption of this ASU to have a material impact on our consolidated statements of financial position and results of operations.

In August 2014, the FASB issued ASU 2014-15, Presentation of Financial Statements Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity s Ability to Continue as a Going Concern. Under this guidance, management will be required to assess an entity s ability to continue as a going concern, and to provide related footnote disclosures in certain circumstances. The provisions of this ASU are effective for annual periods beginning after December 15, 2016, including interim periods within those fiscal years. We do not expect adoption of this ASU to have a material impact on our consolidated statements of financial position and results of operations.

In May 2014 the FASB issued ASU 2014-09, Revenue from Contracts with Customers (Topic 606), which supersedes all existing revenue recognition requirements, including most industry-specific guidance. This standard requires a company to recognize revenue when it transfers goods and services to customers in an amount that reflects the consideration that the company expects to be entitled to in exchange for those goods or services. The ASU also requires additional disclosure about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments and assets recognized from costs incurred to obtain or fulfill a contract. This pronouncement is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The two permitted transition methods under the new standard are the full retrospective method, in which case the standard would be applied to each prior reporting period presented, or the modified retrospective method, in which case the cumulative effect of applying the standard would be recognized at the date of initial application. We have not yet selected a transition method. We are currently evaluating the requirements of this ASU and have not yet determined its impact on our consolidated financial statements or disclosures.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK.

Market Risk and Sensitivity Analysis

Our primary exposures to market risks include fluctuations in interest rates on our Term Loan Facility and investment portfolio, as well as fluctuations in foreign currency exchange rates.

Interest Rate Risk

We hold our cash, cash equivalents and short-term investments for working capital purposes. Some of the securities we invest in are subject to market risk. This means that a change in prevailing interest rates may cause the principal amount of such investments to fluctuate. To minimize this risk, we maintain our portfolio of cash, cash equivalents and short-term investments in a variety of securities, including money market funds and government debt securities. The risk associated with fluctuating interest rates is limited to our investment portfolio. Due to the short-term nature of these instruments, we believe that we do not have any material exposure to changes in the fair value of our investment portfolio as a result of changes in interest rates. Declines in interest rates, however, would reduce future interest income. The effect of a hypothetical 10% increase or decrease in overall interest rates would not have had a material impact on our operating results or the total fair value of the portfolio.

We are exposed to market risks related to fluctuations in interest rates related to our Term Loan Facility. As of June 30, 2016, we owed $723 million on this loan with an interest rate of 4.25%. We performed a sensitivity analysis on the outstanding portion of our debt obligation as of June 30, 2016. Should the current average interest rate increase or decrease by 10%, the resulting annual increase or decrease to interest expense would be approximately $3.1 million as of June 30, 2016.

From time to time, we have outstanding lines of credit and short-term borrowings with variable interest rates, primarily denominated in Japanese Yen. As of June 30, 2016, the outstanding balance of these borrowings was $5.4 million with interest rates ranging from 0.75% to 2.0%. A 10% change in interest rates would not have had a material impact on our operating results.

Foreign Exchange Rate Risk

We mainly enter into forward exchange contracts to reduce currency exposure arising from intercompany sales of inventory. We also enter into forward exchange contracts to reduce foreign exchange risks arising from the change in fair value of certain foreign currency denominated assets and liabilities.

We had forward exchange contracts with notional amounts totaling approximately $66 million outstanding and a net fair value liability of $2.3 million at June 30, 2016. The potential fair value loss for a hypothetical 10% adverse change in the currency exchange rate on our forward exchange contracts at June 30, 2016 would be immaterial.

ITEM 4. CONTROLS AND PROCEDURES.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of June 30, 2016. The term disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act), means controls and other procedures of an issuer that are designed to ensure that information required to be disclosed by the issuer in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by an issuer in the reports that it files or submits under the Exchange Act is accumulated and communicated to the issuer s management, including its principal executive and principal financial officers, or persons performing similar functions as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of June 30, 2016, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level to ensure that information required to be disclosed by us in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and

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forms and is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended June 30, 2016 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS.

On March 9, 2016, a putative class action lawsuit captioned *Dixon Chung v. Newport Corp., et al*, Case No. A-16-733154-C, was filed in the District Court, Clark County, Nevada on behalf of a putative class of stockholders of Newport for claims related to the February 22, 2016 Agreement and Plan of Merger (the Merger Agreement) between the Company, Newport and PSI Equipment, Inc., a Nevada corporation and a wholly owned subsidiary of the Company, (Merger Sub). The complaint filed on March 9, 2016 named as defendants the Company, Newport, Merger Sub, and certain members of Newport s former board of directors. The complaint alleges that the named directors breached their fiduciary duties to Newport s stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, and by agreeing to unfair deal protection devices. The complaint also alleges that the Company, Newport, and Merger Sub aided and abetted the named directors alleged breaches of their fiduciary duties. The complaint seeks injunctive relief, including to enjoin or rescind the Merger Agreement, monetary damages, and an award of attorneys and other fees and costs, among other relief. On March 25, 2016, the plaintiff in the Chung action filed an amended complaint, which adds certain allegations, including that the preliminary proxy statement filed by Newport on March 15, 2016 (the Proxy) omitted material information. The amended complaint also names as defendants the Company, Newport, Merger Sub, and then-current members of Newport s board of directors.

Also on March 25, 2016, a second putative class action complaint captioned *Hubert C. Pincon v. Newport Corp., et al.*, Case No. A-16-734039-B, was filed in the District Court, Clark County, Nevada, on behalf of a putative class of the Newport s stockholders for claims related to the Merger Agreement. The complaint names as defendants the Company, Newport, and Merger Sub and the then-current members of Newport s former board of directors. It alleges that the named directors breached their fiduciary duties to Newport s stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, by agreeing to unfair deal protection devices, and by omitting material information from the Proxy. The complaint also alleges that the Company, Newport, and Merger Sub aided and abetted the named directors alleged breaches of their fiduciary duties. The complaint seeks injunctive relief, including to enjoin or rescind the Merger Agreement, and an award of attorneys and other fees and costs, among other relief.

On April 14, 2016, the Court granted plaintiffs motion to consolidate the Pincon and Chung actions and appointed counsel in the Pincon action as lead counsel. Also on April 14, 2016, the Court granted plaintiffs motion for expedited discovery and scheduled a hearing on plaintiffs anticipated motion for a preliminary injunction for April 25, 2016. On April 20, 2016, plaintiffs filed a motion to vacate the hearing on their anticipated motion for a preliminary injunction and notified the Court that they did not presently intend to file a motion for a preliminary injunction regarding the Merger Agreement. On April 22, 2016, the Court vacated the hearing on plaintiffs anticipated motion for a preliminary injunction.

We believe that the claims asserted in the complaints have no merit and we, Newport, Merger Sub and the named directors intend to defend vigorously against these claims.

We are also subject to various other legal proceedings and claims, which have arisen in the ordinary course of business. In our opinion, the ultimate disposition of these matters will not have a material adverse effect on our results of operations, financial condition or cash flows.

ITEM 1A. RISK FACTORS.

The following describes certain risks we face in our business. Additional risks that we do not yet know of or that we currently believe are immaterial may also impair our business. If any of the events or circumstances described in the following risks actually occurs, our

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business, financial condition or results of operations could suffer, and the trading price of our common stock could decline. In assessing these risks, investors should also refer to the other information contained or incorporated by reference in this report and our other filings with the Securities and Exchange Commission.

Our business depends substantially on capital spending in the semiconductor industry, which is characterized by periodic fluctuations that may cause a reduction in demand for our products.

Approximately 69%, 70% and 68% of our net revenues for the years 2015, 2014 and 2013, respectively, were from sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers. On a pro forma basis, assuming the acquisition of Newport occurred at the beginning of 2016, approximately 51% of our combined net revenues for the first six months of 2016 were from such customers. While our acquisition of Newport has reduced our concentration of customers in these markets, we anticipate that sales to such customers will continue to account for a substantial portion of our sales. Our business depends upon the capital expenditures of semiconductor device manufacturers, which in turn depends upon the demand for semiconductors.

The semiconductor industry is characterized by rapid technological change, frequent product introductions, changing customer requirements and evolving industry standards. Because our customers face uncertainties with regard to the growth and requirements of these markets, their products and components may not achieve, or continue to achieve, anticipated levels of market acceptance. If our customers are unable to deliver products that gain market acceptance, it is likely that these customers will not purchase our products or will purchase smaller quantities of our products. We often invest substantial resources in developing our products and subsystems in advance of significant sales of these products and subsystems to such customers. A failure on the part of our customers products to gain market acceptance, or a failure of the semiconductor market to grow would have a significant negative effect on our business, financial condition and results of operations.

The semiconductor industry has historically been characterized by sudden and severe cyclical variations in product supply and demand. The timing, severity and duration of these market cycles are difficult to predict, and we may not be able to respond effectively to these cycles. The cyclicality of the semiconductor market is demonstrated by the changes in sales to semiconductor capital equipment and device manufacturers in past years. For example, our sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers increased compared to the prior year by 3%, 19% and 14% in 2015, 2014 and 2013, respectively.

During semiconductor market downturns, periods of overcapacity have resulted in rapid and significantly reduced demand for our products, which may result in lower gross margins due to reduced absorption of manufacturing overhead, as our ability to rapidly and effectively reduce our cost structure in response to such downturns is limited by the fixed nature of many of our expenses in the near term. Further, our ability to reduce our long-term expenses is constrained by our need to continue our investment in next-generation product technology and to support and service our products. In addition, due to the relatively long manufacturing lead times for some of the products and subsystems we sell to this market, we may incur expenditures or purchase raw materials or components for products we are unable to sell. Accordingly, downturns in the semiconductor capital equipment market may materially harm our business, financial condition and operating results. Conversely, when upturns in this market occur, we may have difficulty rapidly and effectively increasing our manufacturing capacity to meet sudden increases in customer demand. If we fail to do so we may lose business to our competitors and our relationships with our customers may be harmed. In addition, many semiconductor manufacturers have operations and customers in Asia, a region that in past years has experienced serious economic problems including currency devaluations, debt defaults, lack of liquidity and recessions.

The Newport Merger involves numerous risks, and we may not be able to effectively integrate Newport s business and operations or realize the expected benefits from the acquisition, which could materially harm our operating results.

Our recent acquisition of Newport has significantly increased our size, including with respect to revenue, product offerings, number of employees and facilities. Newport s products and technology, and certain of its markets and customer base, are significantly different from our historical experience. Combining our businesses could make it more difficult to maintain relationships with customers, employees or suppliers. Integrating Newport s business and operations with ours will be complex, challenging and time-consuming and will require significant efforts and expenditures, and we may not be able to achieve the integration in an effective, complete, timely or cost-efficient manner.

Potential risks related to our acquisition of Newport include our ability to:

- expand our financial and management controls and reporting systems and procedures to integrate and manage Newport;

- integrate our information technology systems to enable the management and operation of the combined business;

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- realize expected synergies and cost savings resulting from the acquisition;
- maintain and improve Newport s operations while integrating our combined manufacturing organization;
- avoid lost sales due to customer confusion and misinformation regarding the transaction, and retain and expand Newport s customer base while aligning our sales efforts;
- avoid lost revenue resulting from the distraction or confusion of our personnel as a consequence of the acquisition and ongoing integration efforts;
- retain key Newport personnel;
- recognize and capitalize on anticipated product sales and technology enhancement opportunities presented by our combined businesses;
- adequately familiarize ourselves with Newport s products and technology and certain of its markets and customer base such that we can manage Newport s business effectively; and
- successfully integrate our respective corporate cultures such that we achieve the benefits of acting as a unified company.

Other potential risks related to our acquisition of Newport include:

- the assumption of unknown or contingent liabilities, or other unanticipated events or circumstances; and
- the potential to incur or record significant cash or non-cash charges or write down the carrying value of intangible assets obtained in the Newport acquisition, which could adversely impact our cash flow or lower our earnings in the period or periods for which we incur such charges or write down such assets.

If we are unable to successfully or timely integrate the operations of Newport s business into our business, we may be unable to realize the revenue growth, synergies and other anticipated benefits resulting from the acquisition and our business could be adversely affected. Additionally, we have incurred and will continue to incur transaction-related costs, including legal, regulatory and other costs associated with closing the transaction and formulating and implementing integration plans, including facilities and systems consolidation costs and employment-related costs. Although we expect that the elimination of duplicative costs, as well as the realization of other efficiencies related to the integration of the businesses, should allow us to offset transaction and integration-related costs over time, this net benefit may not be achieved in the near term, or at all. Further, we may not realize the expected benefits from the acquisition. Newport s business and operations may not achieve the anticipated revenues and operating results. We may in the future choose to close or divest certain sectors or divisions of Newport, which could require us to record losses and/or spend cash relating to such closures or divestitures. Any of the foregoing risks could materially harm our business, financial conditions and results of operations.

The terms of our term loan credit facility and asset-based revolving credit facility impose significant financial obligations and risks upon us, limit our ability to take certain actions, and could discourage a change in control.

In April 2016, we obtained a term loan credit facility and a revolving credit facility in connection with financing our acquisition of Newport, and amended it in June 2016. The term loan credit facility as amended provides us with senior secured financing of $730 million, with a term of seven years. The revolving credit facility provides us with senior secured financing of up to $50 million, subject to a borrowing base limitation.

Our indebtedness under these credit facilities will increase our interest expense and could have the effect, among other things, of reducing our flexibility to respond to changing business and economic conditions. Our indebtedness could also reduce funds available for working capital, capital expenditures, acquisitions and other general corporate purposes and may create competitive disadvantages relative to other companies with lower debt levels. If we do not achieve the expected benefits and cost savings from the acquisition, or if the financial performance of the combined company does not meet current expectations, then our ability to service our indebtedness may be adversely impacted.

Amounts outstanding under the credit facilities bear interest at variable interest rates. If interest rates increase, variable rate debt will create higher debt service requirements, which could adversely affect our cash flows. In addition, our credit ratings affect the cost and availability of future borrowings and, accordingly, our cost of capital. Our ratings of our indebtedness reflect each nationally recognized statistical rating organization s opinion of our financial strength, operating performance and ability to meet our debt obligations. There can be

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no assurance that we will achieve a particular rating or maintain a particular rating in the future. Moreover, we may be required to raise substantial additional financing to fund working capital, capital expenditures, acquisitions or other general corporate requirements. Our ability to arrange additional financing or refinancing will depend on, among other factors, our financial position and performance, as well as prevailing market conditions and other factors beyond our control. There can be no assurance that we will be able to obtain additional financing or refinancing on terms acceptable to us or at all.

The term loan credit facility and the asset-based revolving credit facility contain a number of negative covenants that, among other things and subject to certain exceptions, restrict our ability and/or our subsidiaries ability to:

- incur additional indebtedness;
- pay certain dividends on our capital stock or redeem, repurchase or retire certain capital stock or certain other indebtedness;
- make certain investments, loans and acquisitions;
- engage in certain transactions with our affiliates;
- sell assets, including capital stock of our subsidiaries;
- materially alter the business we conduct;
- consolidate or merge;
- incur liens; and
- engage in sale-leaseback transactions

These covenants restrict our ability to engage in or benefit from these actions, thereby limiting our flexibility in planning for, or reacting to, changes and opportunities in the markets in which we compete, such as limiting our ability to engage in mergers and acquisitions. This could place us at a competitive disadvantage.

The term loan credit agreement and the asset-based credit agreement contain customary events of default, including:

- failure to make required payments;

- failure to comply with certain agreements or covenants;
- materially breaching any representation or warranty made or deemed made in connection with the respective credit facility;
- failure to pay, or cause acceleration of, certain other indebtedness;
- certain events of bankruptcy and insolvency;
- failure to pay certain judgments; and
- a change in control of us.

Our ability to repay any amounts owed under these credit facilities will depend upon our future cash balances. The amount of cash available for repayment of these amounts will depend on our usage of our existing cash balances and our operating performance and ability to generate cash flow from operations in future periods, which will be subject to financial, business and other factors affecting our operations, many of which are beyond our control. We cannot provide any assurances that we will generate sufficient cash flow from operations to service our debt obligations. Any failure to repay these obligations as they become due would result in an event of default under the credit facilities.

Further, because a change in control of us constitutes an event of default under these credit facilities, this would likely be a significant deterrent to a potential acquirer, as any potential acquisition would trigger an event of default, unless the lenders agreed to waive such event of default. We cannot guarantee that any such waiver would be obtained.

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If an event of default occurs, the lenders may end their obligation to make loans to us under the credit facilities, and may declare any outstanding indebtedness under the credit facilities immediately due and payable. In such case, we would need to obtain additional financing or significantly deplete our available cash, or both, in order to repay this indebtedness. Any additional financing may not be available on reasonable terms or at all, and significant depletion of our available cash could harm our ability to fund our operations or execute our broader corporate objectives. If we were unable to repay outstanding indebtedness following an event of default, then in addition to other available rights and remedies, the lenders could initiate foreclosure proceedings on substantially all of our assets. Any such foreclosure proceedings or other rights and remedies successfully implemented by the lenders in an event of default would have a material adverse effect on our business, financial condition and results of operations.

Our quarterly operating results have fluctuated, and are likely to continue to vary significantly, which may result in volatility in the market price of our common stock.

A substantial portion of our shipments occurs shortly after an order is received and therefore, we operate with a low level of backlog. As a result, a decrease in demand for our products from one or more customers could occur with limited advance notice and could have a material adverse effect on our results of operations in any particular period. Further, with respect to certain of our business lines, we often recognize a significant portion of net revenues in the last month of each fiscal quarter, due in part to the tendency of customers to wait until late in a quarter to commit to purchase certain of our products as a result of capital expenditure approvals and constraints occurring at the end of a quarter, or the hope of obtaining more favorable pricing from a competitor seeking the business. Thus, variations in timing of sales can cause significant fluctuations in our quarterly sales, gross margin and profitability. Orders expected to ship in one period could shift to another period due to changes in the timing of our customers purchase decisions, rescheduled delivery dates requested by our customers, manufacturing capacity constraints or logistics delays. Our operating results for a particular quarter or year may be adversely affected if our customers, particularly our largest customers, cancel or reschedule orders, or if we cannot fill orders in time due to capacity constraints or unexpected delays in manufacturing, testing, shipping or product acceptance. Also, we base our manufacturing plans on our forecasted product mix. If the actual product mix varies significantly from our forecast, we may not be able to fill some orders, which would result in delays in the shipment of our products and could shift sales to a subsequent period. A significant percentage of our expenses are fixed and based in part on expectations of future net revenues. The inability to adjust spending quickly enough to compensate for any shortfall would magnify the adverse impact of a shortfall in net revenues on our results of operations. Factors that could cause fluctuations in our net revenues include:

- a worldwide economic slowdown or disruption in the global financial markets;
- fluctuations in our customers capital spending, industry cyclicality (particularly in the semiconductor industry), market seasonality (particularly in the scientific research market), levels of government funding available to our customers (particularly in the life sciences and research markets) and other economic conditions within the markets we serve;
- the timing of the receipt of orders within a given period and the level of orders from major customers;
- demand for our products and the products sold by our customers;

shipment delays;

disruption in sources of supply;

production capacity constraints;

specific features requested by customers;

the timing and level of cancellations and delays of orders in backlog for our products;

the timing of product shipments and revenue recognition within a given quarter;

variations in the mix of products we sell;

changes in our pricing practices or in the pricing practices of our competitors or suppliers;

our timing in introducing new products;

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- engineering and development investments relating to new product introductions, and significant changes to our manufacturing and outsourcing operations;
- market acceptance of any new or enhanced versions of our products;
- timing of new product introductions by our competitors;
- timing and level of inventory obsolescence, scrap and warranty expenses;
- the availability, quality and cost of components and raw materials we use to manufacture our products;
- changes in our effective tax rates;
- changes in our capital structure, including cash, marketable securities and debt balances, and changes in interest rates;
- changes in bad debt expense based on the collectability of our accounts receivable;
- timing, type, and size of acquisitions and divestitures, and related expenses and charges;
- fluctuations in currency exchange rates, particularly the Korean won, Japanese yen and Euro as compared with the U.S. dollar;
- our expense levels;
- impairment of goodwill and amortization of intangible assets; and
- fees, expenses and settlement costs or judgments against us relating to litigation.

As a result of the factors discussed above, it is likely that we may in the future experience quarterly or annual fluctuations and that, in one or more future quarters, our operating results may fall below the expectations of public market analysts or investors. In any such event, the price of our common stock could fluctuate or decline significantly. Consequently, we believe that quarter-to-quarter and year-to-year comparisons of our results of operations, or any other similar period-to-period comparisons, may not be reliable indicators of our future performance.

The loss of net revenues from any one of our major customers would likely have a material adverse effect on us.

Our top ten customers accounted for approximately 49%, 50% and 46% of our net revenues for the years 2015, 2014 and 2013, respectively. One customer, Applied Materials, Inc., accounted for approximately 18%, 19% and 17% of our net revenues for the years 2015, 2014 and 2013, respectively, and another customer, Lam Research Corporation, accounted for 13%, 13% and 12% of our net revenues for the years 2015, 2014 and 2013, respectively. In any one reporting period, a single customer or several customers may contribute even a larger percentage of our consolidated revenues. Although our acquisition of Newport in 2016 has reduced our customer concentration somewhat, the loss of a major customer or any reduction in orders by these customers, including reductions due to market or competitive conditions, would likely have a material adverse effect on our business, financial condition and results of operations. None of our significant customers has entered into an agreement with us requiring it to purchase any minimum quantity of our products. The demand for our products from our semiconductor capital equipment customers depends on the cyclicality of our served markets, specifically semiconductor device manufacturer customers.

Attempts to lessen the adverse effect of any loss or reduction of net revenues through the rapid addition of new customers could be difficult because a relatively small number of companies dominate the semiconductor equipment market. Further, prospective customers typically require lengthy qualification periods prior to placing volume orders with a new supplier. Our future success will continue to depend upon:

- our ability to maintain relationships with existing key customers;
- our ability to attract new customers and satisfy any required qualification periods;
- our ability to introduce new products in a timely manner for existing and new customers; and

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- the successes of our customers in creating demand for their capital equipment products that incorporate our products.

As part of our business strategy, we have entered into and may enter into or seek to enter into business combinations and acquisitions that may be difficult to identify and complete, challenging and costly to integrate, disruptive to our business and our management, and/or dilutive to stockholder value.

Since our inception, we have made acquisitions and, as a part of our business strategy, we may enter into additional business combinations and acquisitions. Our ability to successfully identify suitable acquisition targets, complete acquisitions on acceptable terms, and efficiently and effectively integrate our acquired businesses into our organization is critical to our growth. We may not be able to identify target companies that meet our strategic objectives or successfully negotiate and complete acquisitions with companies we have identified on acceptable terms. Additionally, credit facilities only permit us to make acquisitions under certain circumstances, and restrict our ability to incur additional indebtedness. Further, the process of integrating acquired companies into our operations requires significant resources and is time consuming, expensive and disruptive to our business. We may not realize the benefits we anticipate from these acquisitions because of the following significant challenges:

- the difficulty of integrating the operations, technology and personnel of the acquired companies;
- the potential disruption of our ongoing business and distraction of management;
- possible internal control weaknesses of the acquired companies;
- significant expenses related to the acquisitions;
- potential unknown liabilities associated with acquired businesses.
- potentially incompatible cultural differences between the two companies;
- incorporating the acquired company s technology and products into our current and future product lines, and successfully generating market demand for these expanded product lines;
- potential additional geographic dispersion of operations;
- the difficulty in achieving anticipated synergies and efficiencies;
- the difficulty in leveraging the acquired company s and our combined technologies and capabilities across our product lines and customer base;

- potential sales disruptions as a result of integrating the acquired company s sales channels with our sales channels; and

- our ability to retain key customers, suppliers and employees of an acquired company.

We may also be placed at a competitive disadvantage by selling products in markets and geographies that are new to us. In addition, if we are not successful in completing acquisitions that we may pursue in the future, we may be required to re-evaluate our growth strategy, and we may incur substantial expenses and devote significant management time and resources in seeking to complete proposed acquisitions that may not generate benefits for us.

In addition, with future acquisitions, we could use substantial portions of our available cash as all or a portion of the purchase price. We could also issue additional securities as consideration for these acquisitions, which could cause significant stockholder dilution, or obtain additional debt financing, which could reduce our future cash flow, without achieving the desired accretion to our business. Further, our prior acquisitions and any future acquisitions may not ultimately help us achieve our strategic goals and may pose other risks to us.

As a result of our previous acquisitions, we have several different decentralized operating and accounting systems. We will need to continue to modify our accounting policies, internal controls, procedures and compliance programs to provide consistency across all of our operations. In order to increase efficiency and operating effectiveness and improve corporate visibility into our decentralized operations, we are currently implementing a worldwide Enterprise Resource Planning (ERP) system. We expect to continue to implement the ERP system in phases over the next few years. Any future implementations may risk potential disruption of our operations during the conversion periods and the implementations could require significantly more management time and higher implementation costs than currently estimated.

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An inability to convince semiconductor device manufacturers to specify the use of our products to our customers that are semiconductor capital equipment manufacturers would weaken our competitive position.

The markets for our products, in particular the semiconductor capital equipment market, are highly competitive. Our competitive success often depends upon factors outside of our control. For example, in some cases, particularly with respect to mass flow controllers, semiconductor device manufacturers may direct semiconductor capital equipment manufacturers to use a specified supplier s product in their equipment. Accordingly, for such products, our success will depend in part on our ability to have semiconductor device manufacturers specify that our products be used at their semiconductor fabrication facilities. In addition, we may encounter difficulties in changing established relationships of competitors that already have a large installed base of products within such semiconductor fabrication facilities.

If our products are not designed into successive generations of our customers products, we will lose significant net revenues during the lifespan of those products.

New products designed by capital equipment manufacturers typically have a lifespan of five to ten years. Our success depends on our products being designed into new generations of equipment. We must develop products that are technologically advanced so that they are positioned to be chosen for use in each successive generation of capital equipment. If customers do not choose our products, our net revenues may be reduced during the lifespan of our customers products. In addition, we must make a significant capital investment to develop products for our customers well before our products are introduced and before we can be sure that we will recover our capital investment through sales to the customers in significant volume. We are thus also at risk during the development phase that our products may fail to meet our customers technical or cost requirements and may be replaced by a competitive product or alternative technology solution. If that happens, we may be unable to recover our development costs.

The semiconductor industry is subject to rapid demand shifts which are difficult to predict. As a result, our inability to expand our manufacturing capacity or reduce our fixed costs in response to these rapid shifts may cause a reduction in our market share.

Our ability to increase sales of certain products depends in part upon our ability to expand our manufacturing capacity for such products in a timely manner. If we are unable to expand our manufacturing capacity on a timely basis or to manage such expansion effectively, our customers could implement our competitors products and, as a result, our market share could be reduced. Because the semiconductor industry is subject to rapid demand shifts, which are difficult to foresee, we may not be able to increase capacity quickly enough to respond to a rapid increase in demand. Additionally, capacity expansion could increase our fixed operating expenses and if sales levels do not increase to offset the additional expense levels associated with any such expansion, our business, financial condition and results of operations could be materially adversely affected.

Many of the markets and industries that we serve are subject to rapid technological change, and if we fail to introduce new and innovative products or improve our existing products, or if the adoption or applications we serve is not successful, our business, financial condition and results of operations will be harmed.

Many of our markets are characterized by rapid technological advances, evolving industry standards, shifting customer needs, new product introductions and enhancements, and the periodic introduction of disruptive technology that displaces current technology due to a combination of price, performance and reliability. As a result, many of the products in our markets can become outdated quickly and without warning. We depend, to a significant extent, upon our ability to enhance our existing products, to anticipate and address the demands of the marketplace for new and improved and disruptive technologies, either through internal development or by acquisitions, and to be price competitive. If we or our competitors introduce new or enhanced products, it may cause our customers to defer or cancel orders for our existing products. If we or our competitors introduce disruptive technology that displaces current technology, existing product platforms or lines of business from which we generate significant revenue may be rendered obsolete.

Because many of our products are sophisticated and complex, they can be difficult to design and manufacture, and we may experience delays in introducing new products or enhancements to our existing products. If we do not introduce our new products or enhancements into the marketplace in a timely fashion, our customers may choose to purchase our competitors   products. Certain of our markets, in particular the semiconductor capital equipment market, experience severe cyclicality in capital spending, so if we fail to introduce new products in a timely manner we may miss market upturns, or may fail to have our products or subsystems designed into our customers   products. We may not be successful in acquiring, developing, manufacturing or marketing new products and technologies on a timely or cost-effective basis. If we fail to adequately introduce new, competitive products and technologies on a timely basis, our business, financial condition and results of operations will be harmed.

Further, we are constantly investing in products for emerging applications, and we expect to generate increasingly significant revenue levels from sales of products for these applications. These applications are evolving, and the extent to which they achieve widespread adoption or significant growth is uncertain. Many factors may affect the viability of widespread adoption or growth of these applications, including their cost-effectiveness, performance and reliability compared to alternatives. If these applications or our products for these applications are not widely adopted or fail to grow as we project, we will not generate the revenue growth we anticipate from sales of our products for these emerging applications, and our results of operations could be harmed.

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Because the sales cycle for some of our products is long and difficult to predict, and certain of our orders are subject to rescheduling or cancellation, we may experience fluctuations in our operating results.

Many of our products are complex, and customers for these products require substantial time to qualify our products and make purchase decisions. In addition, some of our sales to defense and security customers are under major defense programs that involve lengthy competitive bidding and qualification processes. These customers often perform, or require us to perform, extensive configuration, testing and evaluation of our products before committing to purchasing them, which can require a significant upfront investment by us. The sales cycle for these products from initial contact through shipment varies significantly, is difficult to predict and can last more than a year. If we fail to anticipate the likelihood, costs, or timing associated with sales of these products, our business and results of operations would be harmed.

Our orders are generally subject to rescheduling without penalty or cancellation without penalty other than reimbursement for certain labor and material costs. We from time to time experience order rescheduling and cancellations, which can result in fluctuation of our operating results from period to period.

Certain of our markets, sales regions and customers may be adversely affected by a lack of government funding and the availability of credit.

Our worldwide sales to customers in the scientific research, defense and life and health sciences markets rely to a large extent on government funding for research and defense-related programs. Any decline in government funding as a result of reduced budgets in connection with fiscal austerity measures or other causes would likely result in reduced sales of our products that are purchased either directly or indirectly with government funding, which would have an adverse impact on our results of operations.

Ongoing concerns regarding the global availability of credit also may make it more difficult for our customers to raise capital, whether debt or equity, to finance their projects and purchases of capital equipment. Delays in our customers ability to obtain such financing, or the unavailability of such financing, could adversely affect sales of our products and systems, including, but not limited to, high-value lasers and systems, and therefore harm our business and operating results.

We offer products for multiple markets and must face the challenges of supporting the distinct needs of each of the markets we serve.

We offer products for a number of markets. Because we operate in multiple markets, we must work constantly to understand the needs, standards and technical requirements of many different applications within these markets, and must devote significant resources to developing different products for these markets. Product development is costly and time consuming. We must anticipate trends in our customers industries and develop products before our customers products are commercialized. If we do not accurately predict our customers needs and future activities, we may invest substantial resources in developing products that do not achieve broad market acceptance. Our decision to continue to offer products to a given market or to penetrate new markets is based in part on our judgment of the size, growth rate and other factors that contribute to the attractiveness of a particular market. If our product offerings in any particular market are not competitive or our analyses of a market are incorrect, our business, financial condition and results of operations would be harmed.

Manufacturing interruptions or delays could affect our ability to meet customer demand and lead to higher costs, while the failure to estimate customer demand accurately could result in excess or obsolete inventory.

Our business depends on its timely supply of equipment, services and related products that meet the rapidly changing technical and volume requirements of our customers, which depends in part on the timely delivery of parts, components and subassemblies (collectively,   parts) from suppliers, including contract manufacturers. Cyclical industry conditions and the volatility of demand for manufacturing equipment increase capital, technical, operational and other risks for us and for companies throughout our supply chain. We may also experience significant interruptions of our manufacturing operations, delays in our ability to deliver products or services, increased costs or customer order cancellations as a result of:

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- volatility in the availability and cost of materials, including rare earth elements;
- information technology or infrastructure failures; and
- natural disasters or other events beyond our control (such as earthquakes, floods or storms, regional economic downturns, pandemics, social unrest, political instability, terrorism, or acts of war), particularly where we or our subcontractors and contract manufacturers conduct manufacturing.

In addition, if we need to rapidly increase our business and manufacturing capacity to meet increases in demand or expedited shipment schedules, this may exacerbate any interruptions in our manufacturing operations and supply chain and the associated effect on our working capital. Moreover, if actual demand for our products is different than expected, we may purchase more/fewer parts than necessary or incur costs for canceling, postponing or expediting delivery of parts. If we purchase inventory in anticipation of customer demand that does not materialize, or if our customers reduce or delay orders, we may incur excess inventory charges. Any or all of these factors could materially and adversely affect our business, financial condition and results of operations.

A material amount of our assets represents goodwill and intangible assets, and our net income would be reduced if our goodwill or intangible assets become impaired.

As of June 30, 2016, our goodwill and intangible assets, net, represented approximately $1,020 million, or 45% of our total assets. Goodwill is generated in our acquisitions when the cost of an acquisition exceeds the fair value of the net tangible and identifiable intangible assets we acquire. Goodwill is subject to an impairment analysis at least annually based on the fair value of the reporting unit. Intangible assets relate primarily to the developed technologies, customer relationships and patents and trademarks acquired by us as part of our acquisitions of other companies and are subject to an impairment analysis whenever events or changes in circumstances exist that indicate that the carrying value of the intangible asset might not be recoverable. We will continue to monitor and evaluate the carrying value of goodwill and intangible assets. If market and economic conditions or business performance deteriorate, the likelihood that we would record an impairment charge would increase, which impairment charge could materially and adversely affect our results of operations.

We operate in a highly competitive industry.

The markets for our products are intensely competitive, and we believe that competition from both new and existing competitors will increase in the future. Principal competitive factors include:

- historical customer relationships;
- product quality, performance and price;
- breadth of product line;
- manufacturing capabilities; and

customer service and support.

Although we believe that we compete favorably with respect to these factors, we may not be able to continue to do so. We encounter substantial competition in most of our product lines. Certain of our competitors may enjoy greater name recognition and have greater financial, technical, marketing and other resources than we have, and some may have lower material costs than ours due to their control over sources of components and raw materials. In some cases, competitors are smaller than we are, but well established in specific product niches. We may encounter difficulties in changing established relationships of competitors with a large installed base of products at such customers fabrication facilities. In addition, our competitors can be expected to continue to improve the design and performance of their products. Competitors may develop products that offer price, performance or technological features superior to those of our products. If our competitors develop superior products, we may lose existing customers and market share. Further, technological advances in our served markets may cause one or more of our portfolio of products to be displaced over time. We also face competition in some of our markets from our existing and potential customers who have developed or may develop products that are competitive to ours, or who engage subcontract manufacturers or system integrators to manufacture products or systems on their behalf.

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We face significant risks from doing business internationally.

Our business is subject to risks inherent in conducting business globally. International revenues account for a significant portion of total net sales, with a substantial portion of such sales originating in Asia (especially Korea, Japan, China and Taiwan) and Europe. We expect that international revenues will continue to account for a significant percentage of total net sales for the foreseeable future, and that in particular, the proportion of our sales to Asian customers will continue to increase. Additionally, we have substantial international manufacturing, sales and administrative operations, with significant facilities and employee populations in Europe, Israel and Asia. Our international operations expose us to various risks, which include:

adverse changes or instability in the political or economic conditions in countries or regions where we manufacture or sell our products;

challenges of administering our diverse business and product lines globally;

the actions of government regulatory authorities, including embargoes, import and export restrictions, tariffs, currency controls, trade restrictions and trade barriers, license requirements, environmental and other regulatory requirements and other rules and regulations applicable to the manufacture, import and export of our products, all of which are complicated and potentially conflicting, often require significant investments in cost, time and resources for compliance, and may impose strict and severe penalties for noncompliance;

greater risk of violations of applicable U.S. and international anti-corruption laws by our employees, sales representatives, distributors or other agents;

longer accounts receivable collection periods and longer payment cycles;

overlapping, differing or more burdensome tax structures;

adverse currency exchange rate fluctuations;

reduced or inconsistent protection of intellectual property;

shipping and other logistics complications;

the imposition of restrictions on currency conversion or the transfer of funds;

- costs associated with the repatriation of our overseas earnings; and

- the expropriation of private enterprises.

- more complex and burdensome labor laws and practices in countries where we have employees;

- cultural and management style differences;

- preference for locally-produced products;

- changes in labor conditions and difficulties in staffing and managing foreign operations, including, but not limited to, the formation of labor unions;

- difficulties in staffing and managing each of our individual international operations; and

- increased risk of exposure to civil unrest, terrorist and military activities.

If we experience any of the risks associated with international business, our business, financial condition and results of operations could be significantly harmed.

In particular, we have significant facilities and operations and a considerable number of employees in Israel. A number of our products are manufactured in facilities located in Israel. The Middle East remains a volatile region, and the future of peace efforts between Israel and neighboring countries remains extremely uncertain. Any armed conflicts or significant political instability in the region is likely to negatively affect business conditions and could significantly disrupt our operations in Israel, which would negatively impact our business. Further, many of our employees in Israel are subject to being called for active duty under emergency circumstances. If a military conflict or war arises, these individuals could be required to serve in the military for extended periods of time, and our operations in Israel could be disrupted by the absence of one or more key employees or a significant number of other employees for a significant period of time. Any such disruption could adversely affect our business.

Our failure to successfully manage our offshore manufacturing locations or the transition of certain of our manufacturing operations to other locations and/or to contract manufacturers could harm our business, financial condition and results of operations.

As part of our continuous cost-reduction efforts, we have outsourced a portion of our manufacturing and service to a subcontractor in Mexico, and we continue to relocate the manufacture of certain of our existing product lines and subassemblies to, and initiate the manufacture of certain new products in, our facilities in China, Israel and Romania and selected contract manufacturers in Asia. In the future, we may expand the level of manufacturing and certain other operations that we perform offshore in order to take advantage of cost efficiencies available to us in those countries. However, we may not achieve the significant cost savings or other benefits that we would anticipate from moving manufacturing and other operations to a lower cost region. Additionally, if we are unable to successfully manage the relocation or initiation of the manufacture of these products, our business, financial condition and results of operations could be harmed.

In particular, transferring product lines to other manufacturing locations and/or to our contract manufacturers facilities often requires us to transplant complex manufacturing equipment and processes across a large geographical distance and to train a completely new workforce concerning the use of this equipment and these processes. In addition, certain of our customers may require the requalification of products supplied to them in connection with the relocation of manufacturing operations. If we are unable to manage this transfer and training smoothly and comprehensively, or if we are unable to complete the requalification of products in a timely manner, we could suffer manufacturing and supply chain delays, excessive product defects, harm to our results of operations and our reputation with our customers, and loss of customers. We also may not realize the cost and tax advantages that we currently anticipate from locating operations in Mexico, China, Israel and Romania. For example, we are experiencing rising material, labor and shipping costs in China.

Additionally, qualifying contract manufacturers and commencing volume production are expensive and time-consuming activities, and there is no guarantee we will continue to do so successfully. Further, our reliance on contract manufacturers reduces our control over the assembly process, quality assurance, production costs and material and component supply for our products. If we fail to manage our relationship with our contract manufacturers, or if any of the contract manufacturers experience financial difficulty, or delays, disruptions, capacity constraints or quality control problems in their operations, our ability to ship products to our customers could be impaired and our competitive position and reputation could be harmed. Further, if we or our contract manufacturers are unable to negotiate with suppliers for reduced component costs, our operating results could be harmed.

In addition, our contract manufacturers may terminate our agreements with them upon prior notice to us or immediately for reasons such as if we become insolvent, or if we fail to perform a material obligation under the agreements. If we are required to change contract manufacturers or assume internal manufacturing operations for any reason, including the termination of one of our contracts, we will likely suffer manufacturing and shipping delays, lost revenue, increased costs and damage to our customer relationships, any of which could harm our business, financial condition and results of operations.

Our products could contain defects, which would increase our costs and seriously harm our business, operating results, financial condition and customer relationships.

Many of our products are inherently complex in design and, in some cases, require ongoing regular maintenance. Further, the manufacture of these products often involves a highly complex and precise process and the utilization of specially qualified components that conform to stringent specifications. As a result of the technical complexity of these products, design defects, changes in our or our suppliers manufacturing processes or the inadvertent use of defective or nonconforming materials by us or our suppliers could adversely affect our manufacturing yields and product reliability. This could in turn harm our business, operating results, financial condition and customer relationships.

We provide warranties for our products, and we accrue allowances for estimated warranty costs at the time we recognize revenue for the sale of the products. The determination of such allowances requires us to make estimates of product return rates and expected costs to repair or replace the products under warranty. We establish warranty reserves based on historical warranty costs for our products. If actual return rates or repair and replacement costs differ significantly from our estimates, our results of operations could be negatively impacted.

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Our customers may discover defects in our products after the products have been fully deployed and operated under peak stress conditions. In addition, some of our products are combined with products from other suppliers, which may contain defects. As a result, should problems occur, it may be difficult to identify the source of the problem. If we are unable to identify and fix defects or other problems, we could experience, among other things:

- loss of customers;
- increased costs of product returns and warranty expenses;
- increased costs required to analyze and mitigate the defects or problems;
- damage to our reputation;
- failure to attract new customers or achieve market acceptance;
- diversion of development and engineering resources; and/or
- legal action by our customers.

The occurrence of any one or more of the foregoing factors could seriously harm our business, financial condition and results of operations.

Our products are subject to potential product liability claims which, if successful, could have a material adverse effect on our business, financial condition and results of operations.

Certain of our products may be hazardous if not operated properly or if defective. In addition, some of our products, such as certain ultrafast lasers, are used in medical applications where malfunctions could result in serious injury. We are exposed to significant risks for product liability claims if death, personal injury or property damage results from the use of our products. We may experience material product liability losses in the future. We currently maintain insurance against product liability claims. However, our insurance coverage may not continue to be available on terms that we accept, if at all. This insurance coverage also may not adequately cover liabilities that we incur. Further, if our products are defective, we may be required to recall or redesign these products. A successful claim against us that exceeds our insurance coverage level or that is not covered by insurance, or any product recall, could have a material adverse effect on our business, financial condition and results of operations.

We are subject to international trade compliance regulations, and violations of those regulations could result in fines or trade restrictions, which could have a material adverse effect on us.

We are subject to trade compliance laws in both the United States and other jurisdictions where we operate. For example, exports of our products and technology developed or manufactured in the U.S. are subject to export controls imposed by the U.S. Government and administered by the U.S. Departments of Commerce, State and Treasury.

Similar export regulations govern exports of our products and technology developed or manufactured in certain other countries, including Austria, France, Germany, Israel and Romania. In certain instances, these regulations may require obtaining licenses from the administering agency prior to exporting products or technology to international locations or foreign nationals, including foreign nationals employed by us in the United States and abroad. For products and technology subject to the U.S. Export Administration Regulations administered by the U.S. Department of Commerce s Bureau of Industry and Security, the requirement for a license is dependent on the type and end use of the product and technology, the final destination and the identity and nationality of the end user. Virtually all exports from the United States of defense articles subject to the International Traffic in Arms Regulations, administered by the Department of State s Directorate of Defense Trade Controls, require a license. The Israeli Ministry of Economy and the Defense Export Control Agency of the Israeli Ministry of Defense administer similar export regulations and license requirements, which apply to many of our products and technology developed or manufactured in Israel. Obtaining export licenses can be difficult and time-consuming, and we may not be successful in obtaining them. Failure to obtain export licenses to enable product and technology exports could reduce our revenue, harm our relationships with our customers and could adversely affect our business, financial condition and results of operations. Compliance with export regulations may also subject us to additional fees and costs. The absence of comparable export restrictions on competitors in other countries may adversely affect our competitive position. In addition, if we or our international representatives or distributors fail to comply with any of these export regulations, we or they could be subject to civil and criminal, monetary and non-monetary penalties, disruptions to our business, restrictions on our ability to export products and technology and damage to our reputation, and our business and results of operations could be significantly harmed. While we have implemented policies and procedures to comply with these laws, we cannot assure you that our employees, contractors, suppliers or agents will not violate such laws or our policies. For example, as a result of a 2012 U.S. government investigation, a former employee of our Shanghai office and a third party not affiliated with us were imprisoned for export violations relating to the sale of certain of our products. We were not a target of the government s investigation and we cooperated fully with the government s investigation. In addition, although we conducted our own internal investigation and took corrective human resources actions and have, since 2012, implemented additional export compliance procedures, we cannot be certain these efforts will be sufficient to avoid similar situations in the future.

Unfavorable currency exchange rate fluctuations may lead to lower operating margins or may cause us to raise or reduce prices, which could result in reduced sales.

Currency exchange rate fluctuations could have an adverse effect on our net revenues and results of operations and we could experience losses with respect to our hedging activities. Unfavorable currency fluctuations could require us to increase or decrease prices to foreign customers, which could result in lower net revenues by us to such customers. Alternatively, if we do not adjust the prices for our products in response to unfavorable currency fluctuations, our results of operations could be adversely affected by declining net revenues or profit margins for our products in international markets when the sales are translated into U.S. dollars. Such exchange rate fluctuations could also increase the costs and expenses of our non-U.S. operations when translated into U.S. dollars or require us to modify our current business practices. In addition, most sales made by our foreign subsidiaries are denominated in the currency of the country in which these products are sold and the currency they receive in payment for such sales could be less valuable at the time of receipt as a result of exchange rate fluctuations. We enter into forward foreign exchange contracts to reduce a portion of our currency exposure arising from intercompany sales of inventory as well as intercompany accounts receivable and intercompany loans. However, we cannot be certain that our efforts will be adequate to protect us against significant currency fluctuations or that such efforts will not expose us to additional exchange rate risks.

Changes in tax rates or tax regulation could affect results of operations.

As a global company, we are subject to taxation in the United States and various other countries. Significant judgment is required to determine and estimate worldwide tax liabilities. Our future annual and quarterly effective tax rates could be affected by numerous factors, including changes in the applicable tax laws; composition of pre-tax income in countries with differing tax rates; and/or valuation of our deferred tax assets and liabilities. In addition, we are subject to regular examination by the United States Internal Revenue Service and state, local and foreign tax authorities. We regularly assess the likelihood of favorable or unfavorable outcomes resulting from these examinations to determine the adequacy of our provision for income taxes. Although we believe our tax estimates are reasonable, there can be no assurance that any final determination will not be materially different from the treatment reflected in our historical income tax provisions and accruals, which could materially and adversely affect our financial condition and results of operations.

Key personnel may be difficult to attract and retain.

Our ability to maintain and grow our business is directly related to the service of our employees in each area of our business. Our future performance will be directly tied to our ability to hire, train, motivate and retain qualified personnel, including highly skilled technical, financial, managerial and sales and marketing personnel. Competition for personnel in the technology marketplace is intense, and we cannot be certain that we will be successful in attracting and retaining such personnel. We have from time to time in the past experienced attrition in certain key positions, and we expect to continue to experience this attrition in the future. The absence of incentive plan bonuses and equity award vesting as a result of not meeting certain financial performance targets could adversely affect our ability to attract new employees and to retain and motivate our existing employees. If we are unable to hire sufficient numbers of employees with the experience and skills we need or to retain and motivate our existing employees, our business and results of operations would be harmed.

A breach of our operational or security systems could negatively affect our business and results of operations.

We rely on various information technology networks and systems, some of which are managed by third parties, to process, transmit and store electronic information, including confidential data, and to carry out and support a variety of business activities, including manufacturing, research and development, supply chain management, sales and accounting. A failure in or a breach of our operational or security systems or infrastructure, or those of our suppliers and other service providers, including as a result of cyber-attacks, could disrupt our business, result in the disclosure or misuse of proprietary or confidential information, damage our reputation, cause losses and increase our costs.

Our proprietary technology is important to the continued success of our business. Our failure to protect this proprietary technology may significantly impair our competitive position.

Our success and ability to compete depend in large part upon protecting our proprietary technology. We rely on a combination of patent, trademark and trade secret protection and nondisclosure agreements to protect our proprietary rights. The steps we have taken may not

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be sufficient to prevent the misappropriation of our intellectual property, particularly in countries outside the United States, where the laws may not protect our proprietary rights as fully as in the United States. Patent and trademark laws and trade secret protection may not be adequate to deter third party infringement or misappropriation of our patents, trademarks and similar proprietary rights. In addition, patents issued to us may be challenged, invalidated or circumvented. Our rights granted under those patents may not provide competitive advantages to us, and the claims under our patent applications may not be allowed. We have in the past and may in the future be subject to or may initiate interference proceedings in the United States Patent and Trademark Office, which can demand significant financial and management resources. The process of seeking patent protection can be time consuming and expensive and patents may not be issued from currently pending or future applications. Moreover, our existing patents or any new patents that may be issued may not be sufficient in scope or strength to provide meaningful protection or any commercial advantage to us. We may initiate claims or litigation against third parties for infringement of our proprietary rights in order to determine the scope and validity of our proprietary rights or the proprietary rights of our competitors, which claims could result in costly litigation, the diversion of our technical and management personnel and the assertion of counterclaims by the defendants, including counterclaims asserting invalidity of our patents. We will take such actions where we believe that they are of sufficient strategic or economic importance to us to justify the cost. For example, in 2012 we filed a lawsuit against Lighthouse Photonics Incorporated asserting infringement of certain of our patents by that company s laser products, which we settled on confidential terms in August 2014. If we are unsuccessful at effectively protecting our intellectual property, our business, financial condition and results of operations could be harmed.

We have experienced, and may in the future experience, intellectual property infringement claims, which could be costly and time consuming to defend and may produce outcomes that could have a material adverse effect on our business, financial condition or results of operations.

We have from time to time received claims from third parties alleging that we are infringing certain trademarks, patents or other intellectual property rights held by them. Such infringement claims have in the past and may in the future result in litigation. Any such litigation could be protracted and costly, and we could become subject to damages for infringement, or to an injunction preventing us from selling one or more of our products or using one or more of our trademarks. Such claims could also result in the necessity of obtaining a license relating to one or more of our products or current or future technologies, which may not be available on commercially reasonable terms or at all. Any intellectual property litigation and the failure to obtain necessary licenses or other rights or develop substitute technology may divert management s attention from other matters and could have a material adverse effect on our business, financial condition and results of operations. In addition, the terms of our customer contracts typically require us to indemnify the customer in the event of any claim of infringement brought by a third party based on our products. Any claims of this kind may have a material adverse effect on our business, financial condition or results of operations.

The market price of our common stock has fluctuated and may continue to fluctuate for reasons over which we have no control.

The stock market has from time to time experienced, and is likely to continue to experience, extreme price and volume fluctuations. Prices of securities of technology companies have been especially volatile and have often fluctuated for reasons that are unrelated to the operating performance of the companies. Historically, the market price of shares of our common stock has fluctuated greatly and could continue to fluctuate due to a variety of factors. In the past, companies that have experienced volatility in the market price of their stock have been the objects of securities class action litigation. If we were the object of securities class action litigation, it could result in substantial costs and a diversion of our management s attention and resources.

We may not pay dividends on our common stock.

Holders of our common stock are only entitled to receive such dividends when and if they are declared by our board of directors. Although we have declared cash dividends on our common stock since 2011, we are not required to do so and we may reduce or eliminate our cash dividend in the future. This could adversely affect the market price of our common stock.

Our dependence on sole, limited source suppliers, and international suppliers, could affect our ability to manufacture products and systems.

We rely on sole, limited source suppliers and international suppliers for a few of our components and subassemblies that are critical to the manufacturing of our products due to unique component designs as well as specialized quality and performance requirements needed to manufacture our products. This reliance involves several risks, including the following:

- the potential inability to obtain an adequate supply of required components;
- reduced control over pricing and timing of delivery of components; and
- the potential inability of our suppliers to develop technologically advanced products to support our growth and development of new systems.

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We believe we could obtain and qualify alternative sources for most sole, limited source and international supplier parts; however, the transition time may be long if we were required to obtain alternative sources. Seeking alternative sources for these parts could require us to redesign our systems, resulting in increased costs and likely shipping delays. In such an event, any inability to redesign our systems could result in further costs and shipping delays. These increased costs would decrease our profit margins if we could not pass the costs to our customers. Further, shipping delays could damage our relationships with current and potential customers and have a material adverse effect on our business and results of operations.

In addition, we obtain some of the critical capital equipment we use to manufacture certain of our products from sole or limited sources due to the unique nature of the equipment. In some cases, such equipment can only be serviced by the manufacturer or a very limited number of service providers due to the complex and specialized nature of the equipment. If service and/or spare parts for such equipment become unavailable, such equipment could be rendered inoperable, which could cause delays in the production of our products, and could require us to procure alternate equipment, if available, which would likely involve long lead times and significant additional cost, and could harm our results of operations.

We are subject to environmental regulations. If we fail to comply with these regulations, our business could be harmed.

Our operations are subject to various federal, state, local and international regulations relating to the protection of the environment, including those governing discharges of pollutants into the air and water, the management and disposal of hazardous substances and waste and the cleanup of contaminated sites. In the United States, we are subject to the federal regulation and control of the Environmental Protection Agency (EPA), and we are subject to comparable authorities in other countries. Some of our operations require environmental permits and controls to prevent and reduce air and water pollution, and these permits are subject to modification, renewal and revocation by issuing authorities. Future developments, administrative actions or liabilities relating to environmental matters could have a material adverse effect on our business, results of operations or financial condition.

Although we believe that our safety procedures for using, handling, storing and disposing of such materials comply with the standards required by state and federal laws and regulations, we cannot completely eliminate the risk of accidental contamination or injury from these materials. We have been, and may in the future be, subject to claims by employees or third parties alleging such contamination or injury, and could be liable for damages, which liability could exceed the amount of our liability insurance coverage (if any) and the resources of our business.

Certain portions of the soil at Spectra-Physics former facility located in Mountain View, California, and certain portions of the aquifer surrounding the facility, through which contaminated groundwater flowed, are part of an EPA-designated Superfund site and are subject to a cleanup and abatement order from the California Regional Water Quality Control Board. Spectra-Physics, which Newport acquired in 2004, along with other entities with facilities located near the Mountain View, California facility, were identified as Responsible Parties with respect to this Superfund site, due to releases of hazardous substances during the 1960s, 1970s and 1980s. Spectra-Physics and the other Responsible Parties entered into a cost-sharing agreement covering the costs of remediating the off-site groundwater impact. The site is mature, and investigations, monitoring and remediation efforts by the Responsible Parties have been ongoing for approximately 30 years. However, we will likely be subject to additional remediation obligations in the future if the EPA and the California Regional Water Quality Control Board determine that the site cleanup requires additional measures to ensure that it meets current standards for environmental contamination. In addition to our investigation, monitoring and remediation obligations, we may be liable for property damage or personal injury claims relating to this site. While we are not aware of any material claims at this time, such claims could be made against us in the future. We have certain ongoing costs related to investigation, monitoring and remediation of the site that have been fairly consistent and not material in the recent past. However, our ultimate costs of remediation and other potential liabilities are difficult to predict. If significant costs or other liability relating to this site arise in the future, our business, financial condition and results of operations could be adversely affected.

The environmental regulations that we are subject to include a variety of federal, state, local and international environmental regulations that restrict the use and disposal of materials used in the manufacture of our products or require design changes or recycling of our products. If we fail to comply with any present or future regulations, we could be subject to future liabilities, the suspension of manufacturing or a prohibition on the sale of products we manufacture. In addition, such regulations could restrict our ability to equip our facilities or could require us to acquire costly equipment, or to incur other significant expenses to comply with environmental regulations, including expenses associated with the recall of any non-compliant product and the management of historical waste.

Governmental entities at all levels are continuously enacting new environmental regulations, and it is initially difficult to anticipate how such regulations will be implemented and enforced. We continue to evaluate the requirements for compliance with such regulations as they are enacted. For example, the European Union has enacted the Restriction on the Use of Certain Hazardous Substances in Electrical and

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Electronic Equipment Directive (RoHS) and the Waste Electrical and Electronic Equipment Directive (WEEE) for implementation in each European Union member country. RoHS regulates the use of certain hazardous substances in certain products, and WEEE requires the collection, reuse and recycling of waste from certain products. Effective January 2013, RoHS was recast to expand the scope of equipment subject to the directive and impose new compliance requirements, and most European Union member states implemented the recast directive during 2013. WEEE was also recast to expand the scope of equipment subject to the directive and impose increased combined reuse/recycling and collection targets, among other revisions, and European Union member states began to implement the recast directive in 2014. Certain of our products sold in these countries are or will become subject to RoHS and WEEE requirements. We will continue to monitor RoHS and WEEE guidance in individual jurisdictions to determine our responsibilities. In some instances, we are not directly responsible for compliance with RoHS and WEEE because certain of our products are currently outside the scope of the directives. However, because the scope of the directives continues to expand, we will likely be directly or contractually subject to certain provisions of such regulations in the case of many of our products. In addition, certain of our customers, particularly OEM customers whose end products may be subject to these directives, may require that the products we supply to them comply with these directives. Further, final legislation from individual jurisdictions that have not yet implemented the directives may impose different or additional responsibilities upon us. We are also aware of similar legislation that is currently in force or being considered in various states within the United States, as well as other countries, such as Japan, China and South Korea. These regulations may require us to redesign our products or source alternative components to ensure compliance with applicable requirements, for example by mandating the use of different types of materials in certain components. Any such redesign or alternative sourcing may increase the cost of our products, adversely impact the performance of our products, add greater testing lead-times for product introductions, or in some cases limit the markets for certain products. Our failure to comply with any of such regulatory requirements or contractual obligations could result in our being directly or indirectly liable for costs, fines or penalties and third-party claims, and could jeopardize our ability to conduct business in certain countries.

Regulations and customer demands related to conflict minerals and hazardous materials may adversely affect us.

The Dodd-Frank Wall Street Reform and Consumer Protection Act and the implementing regulations subsequently adopted by the SEC impose disclosure requirements regarding the use in our products of conflict minerals mined from the Democratic Republic of Congo and adjoining countries, whether or not the components of our products are manufactured by us or third parties. In addition, certain of our customers have requested that we disclose to them our use of numerous hazardous materials in our products. Our supply chain is very complex and the implementation of these requirements could adversely affect the sourcing, availability and pricing of materials used in the manufacture of our products. In addition, there are additional costs associated with complying with the disclosure requirements and customer requests, such as costs related to our due diligence to determine the source of any conflict minerals or the identity of any hazardous materials used in our products. We face the additional challenge that many of our suppliers, both domestic and foreign, are not obligated by the new conflict minerals law to investigate their own supply chain. Despite our due diligence efforts, we may be unable to verify the origin of all conflict minerals used in our products and/or the use of one or more hazardous materials in our products. As a result, we may be unable to certify that our products are conflict-free and/or free of certain hazardous materials. If we are unable to meet our customer requirements, customers may discontinue purchasing from us, which could adversely impact our business, financial condition or operating results.

Some provisions of our restated articles of organization, as amended, our amended and restated by-laws and Massachusetts law could discourage potential acquisition proposals and could delay or prevent a change in control.

Anti-takeover provisions could diminish the opportunities for stockholders to participate in tender offers, including tender offers at a price above the then current market price of our common stock. Such provisions may also inhibit increases in the market price of our common stock that could result from takeover attempts. For example, while we have no present plans to issue any preferred stock, our board of directors, without further stockholder approval, may issue preferred stock that could have the effect of delaying, deterring or preventing a change in control of us. The issuance of preferred stock could adversely affect the voting power of the holders of our common stock, including the loss of voting control to others. In addition, our amended and restated by-laws provide for a classified board of directors consisting of three classes. Our classified board could also have the effect of delaying, deterring or preventing a change in control of our Company.

Changes in financial accounting standards may adversely affect our reported results of operations.

A change in accounting standards or practices could have a significant effect on our reported results (such as the new revenue recognition rules which are scheduled to go into effect in 2018) and may even affect our reporting of transactions completed before the change is effective. New accounting pronouncements and varying interpretations of existing accounting pronouncements have occurred and may occur in the future. Such changes may adversely affect our reported financial results or may impact our related business practice.

ITEM 6. EXHIBITS.

The exhibits filed as part of this quarterly report on Form 10-Q are listed in the exhibit index immediately preceding the exhibits and are incorporated herein.

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SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

		MKS INSTRUMENTS, INC.
August 3, 2016	By:	/s/ Seth H. Bagshaw Seth H. Bagshaw
		Vice President, Chief Financial Officer and Treasurer (Principal Financial Officer)

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EXHIBIT INDEX

Exhibit No.	Exhibit Description
+3.1(1)	Restated Articles of Organization of the Registrant
+3.2(2)	Articles of Amendment to Restated Articles of Organization, as filed with the Secretary of State of Massachusetts on May 18, 2001
+3.3(3)	Articles of Amendment to Restated Articles of Organization, as filed with the Secretary of State of Massachusetts on May 16, 2002
+3.4(4)	Amended and Restated By-Laws of the Registrant
+10.1(5)	Term Loan Credit Agreement, by and among the Registrant, Barclays Bank PLC, as administrative agent and collateral agent, and the lenders from time to time party thereto, dated April 29, 2016
+10.2(8)	Amendment No. 1 to Term Loan Credit Agreement, dated as of June 9, 2016 among the Company, the other loan parties party thereto, Barclays Bank PLC, as administrative agent and collateral agent, and each participating lender party thereto
+10.3(5)	ABL Credit Agreement, by and among the Registrant, Deutsche Bank AG New York Branch, as administrative agent and collateral agent, the other borrowers from time to time party thereto, and the lenders and letters of credit issuers from time to time party thereto, dated April 29, 2016
+10.4(6)*	Letter Agreement between the Registrant and Robert J. Phillippy, dated May 2, 2016
+10.5(7)*	Newport Corporation s 2006 Performance-Based Stock Incentive Plan
+10.6(7)*	Form of Stock Appreciation Right Award Agreement under Newport Corporation s 2006 Performance-Based Stock Incentive Plan
+10.7(7)*	Newport Corporation s 2011 Stock Incentive Plan
+10.8(7)*	Newport Corporation s Amended and Restated 2011 Stock Incentive Plan
+10.9(7)*	Form of Restricted Stock Unit Award Agreement (with performance-based vesting) used under Newport Corporation s 2011 Stock Incentive Plan and Amended and Restated 2011 Stock Incentive Plan
+10.10(7)*	Form of Stock Appreciation Right Award Agreement used under Newport Corporation s 2011 Stock Incentive Plan and the Amended and Restated 2011 Stock Incentive Plan
+10.11(7)*	Form of Indemnification Agreement between Newport Corporation and Robert J. Phillippy
+10.12(7)*	Form of the Registrant s RSU Assumption Agreement for U.S. Employees Relating to Newport Corporation s Amended and Restated 2011 Stock Incentive Plan and 2011 Stock Incentive Plan
+10.13(7)*	Form of the Registrant s RSU Assumption Agreement for Employees Outside of the United States Relating to Newport Corporation s Amended and Restated 2011 Stock Incentive Plan and 2011 Stock Incentive Plan
+10.14(7)*	Form of the Registrant s SAR Assumption Agreement for U.S. Employees Relating to Newport Corporation s Amended and Restated 2011 Stock Incentive Plan, 2011 Stock Incentive Plan and 2006 Performance-Based Stock Incentive Plan

+10.15(7)*	Form of the Registrant s SAR Assumption Agreement for Employees Outside of the United States Relating to Newport Corporation s Amended and Restated 2011 Stock Incentive Plan, 2011 Stock Incentive Plan and 2006 Performance-Based Stock Incentive Plan
10.16*	Employment Agreement dated August 1, 2016 between Seth Bagshaw and the Registrant
10.17*	Employment Agreement dated August 1, 2016 between John Abrams and the Registrant
10.18*	Employment Agreement dated August 1, 2016 between John Lee and the Registrant
10.19*	Employment Agreement dated August 1, 2016 between Brian Quirk and the Registrant
10.20*	Employment Agreement dated August 1, 2016 between Dennis Werth and Newport Corporation
10.21*	Summary of 2016 Cash Incentive Bonus Arrangements with Dennis Werth
10.22*	Form of Indemnification Agreement between Newport Corporation and Dennis L. Werth
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended
32.1	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS	XBRL Instance Document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Calculation Linkbase Document.
101.LAB	XBRL Taxonomy Labels Linkbase Document.
101.PRE	XBRL Taxonomy Presentation Linkbase Document.
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.

+ Previously filed
* Management contract or compensatory plan arrangement.

Table of Contents

(1) Incorporated by reference to the Registration Statement on Form S-4 (File No. 333-49738) filed with the Securities and Exchange Commission on November 13, 2000.

(2) Incorporated by reference to the Registrant s Quarterly Report on Form 10-Q for the quarter ended June 30, 2001.

(3) Incorporated by reference to the Registrant s Quarterly Report on Form 10-Q for the quarter ended June 30, 2002.

(4) Incorporated by reference to the Registrant s Current Report on Form 8-K filed with the Securities and Exchange Commission on May 6, 2014.

(5) Incorporated by reference to the Registrant s Current Report on Form 8-K filed with the Securities and Exchange Commission on April 29, 2016.

(6) Incorporated by reference to the Registrant s Current Report on Form 8-K filed with the Securities and Exchange Commission on May 2, 2016.

(7) Incorporated by reference to the Registrant s Quarterly Report on Form 10-Q for the quarter ended March 31, 2016.

(8) Incorporated by reference to the Registrant s Current Report on Form 8-K filed with the Securities and Exchange Commission on June 9, 2016.