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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

SCHEDULE 14A

Proxy Statement Pursuant to Section 14(a) of
the Securities Exchange Act of 1934 (Amendment No.)

Filed by the Registrant

Filed by a Party other than the Registrant

Check the appropriate box:

- Preliminary Proxy Statement
- Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))**
- Definitive Proxy Statement
- Definitive Additional Materials
- Soliciting Material under §240.14a-12

Axcelis Technologies, Inc.

(Name of Registrant as Specified In Its Charter)

(Name of Person(s) Filing Proxy Statement, if other than the Registrant)

Payment of Filing Fee (Check the appropriate box):

- No fee required.
- Fee computed on table below per Exchange Act Rules 14a-6(i)(1) and 0-11.
 - (1) Title of each class of securities to which transaction applies:

 - (2) Aggregate number of securities to which transaction applies:

 - (3) Per unit price or other underlying value of transaction computed pursuant to Exchange Act Rule 0-11 (set forth the amount on which the filing fee is calculated and state how it was determined):

 - (4) Proposed maximum aggregate value of transaction:

 - (5) Total fee paid:

- Fee paid previously with preliminary materials.
- Check box if any part of the fee is offset as provided by Exchange Act Rule 0-11(a)(2) and identify the filing for which the offsetting fee was paid previously. Identify the previous filing by registration statement number, or the Form or Schedule and the date of its filing.
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 - (2) Form, Schedule or Registration Statement No.:

 - (3) Filing Party:

 - (4) Date Filed:



**NOTICE OF ANNUAL MEETING OF STOCKHOLDERS
to Be Held April 26, 2011**

The 2011 annual meeting of the stockholders of Axcelis Technologies, Inc., a Delaware corporation, will be held at the offices of the Company at 108 Cherry Hill Drive, Beverly, Massachusetts, at 10:30 a.m. on Tuesday, April 26, 2011 for the following purposes:

1. To elect as directors the six (6) nominees named in the attached proxy statement to serve until the 2012 annual meeting of stockholders.
2. To ratify the appointment of our independent registered public accounting firm to audit our financial statements for the year ending December 31, 2011.
3. To approve the compensation of our named executive officers.
4. To recommend to the Board of Directors the frequency of stockholder votes to approve executive compensation.
5. To transact such other business as may properly come before the meeting or any adjournment thereof.

Only stockholders of record at the close of business on March 1, 2011 will be entitled to vote at the annual meeting or at any adjournment. **It is important that your shares be represented at the meeting. Therefore, whether or not you plan to attend the meeting, please complete your proxy card and return it in the enclosed envelope, which requires no postage if mailed in the United States. If you attend the meeting and wish to vote in person, your proxy will not be used.**

By order of the Board of Directors,

A handwritten signature in black ink, appearing to read "Lynnette Fallon", is written over a faint, larger version of the same signature.

Lynnette C. Fallon,
Secretary

Dated: March 25, 2011

Directions to 108 Cherry Hill Drive, Beverly, MA

From Boston's Logan Airport: On leaving Boston's Logan Airport, take Route 1A north for 3 miles. Turn left onto Route 60 West for 2 miles. At the 2nd rotary, take Route 1 North for 6.6 miles. Exit onto Routes 95/128 North toward Gloucester.

From Route 128 North: Take Route 128 North to Exit 22 W. At bottom of exit ramp, take a right onto Route 62. Take your first right onto State Road, bear right at fork onto Conant Street. Follow Conant Street past the Cherry Hill Creamery on left and take a left onto Cherry Hill Drive. 108 Cherry Hill Drive is the first building on your right.

PROXY STATEMENT

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GENERAL INFORMATION ABOUT VOTING

The Board of Directors of Axcelis Technologies, Inc. ("Axcelis" or the "Company") is soliciting your proxy for use at the 2011 annual meeting of stockholders to be held on Tuesday, April 26, 2011 and at any adjournment of the meeting. This proxy statement and the accompanying proxy card are first being sent or given to stockholders of Axcelis on or about March 25, 2011. The meeting will be held at the Company's offices at 108 Cherry Hill Drive, Beverly MA. Driving directions are on the Notice accompanying this Proxy Statement.

Important Notice Regarding the Availability of Proxy Materials for the Shareholder Meeting to Be Held on April 26, 2011: This Proxy Statement and our Annual Report to Shareholders are available on our website at www.axcelis.com/proxy.html.

Who can vote. You may vote your shares of Axcelis common stock at the annual meeting if you were a stockholder of record at the close of business on March 1, 2011. On that date, there were 105,981,484 shares of common stock outstanding. You are entitled to one vote for each share of common stock that you held on the record date.

How to vote your shares. You may vote either by proxy or by attending the meeting and voting in person. To vote by proxy, either (A) complete, sign, date and mail your proxy card or voting instruction form or (B) follow the instructions on the card or form for voting by telephone or on the Internet. If your shares are held by a nominee (e.g., a bank or broker), you must request a legal proxy from your nominee as proof of ownership in order to vote in person at the meeting.

The proxies named in the proxy card will vote your shares as you have instructed. If you sign and return the proxy card without indicating how your votes should be cast, the proxies will vote your shares in favor of each proposal, as recommended by our Board of Directors. Even if you plan to attend the meeting, please complete and mail your proxy card to ensure that your shares are represented at the meeting. If you attend the meeting, you can still revoke your proxy by voting in person. If your shares are held in a brokerage or bank account, you must make arrangements with your broker or bank to vote your shares in person.

Proposals to be considered at the annual meeting. The principal business expected to be transacted at the meeting, as more fully described below, will be the re-election of six directors whose current terms end in 2011, the ratification of the selection of independent auditors of the Company and advisory votes on executive compensation and the frequency of stockholder votes on executive compensation.

Quorum. A quorum of stockholders is required to transact business at the meeting. A majority of the outstanding shares of common stock entitled to vote, represented at the meeting in person or by proxy, constitutes a quorum for the transaction of business.

Number of votes required. The number of votes required to approve the proposals that are scheduled to be presented at the meeting is as follows:

<u>Proposal</u>	<u>Required Vote</u>
• Election of six nominees as directors	Each nominee must receive a plurality of the votes cast.
• Ratification of the appointment of our independent registered public accounting firm (our "independent auditors") to audit our financial statements for 2011	The proposal will be considered approved if more votes are cast in favor than against.
• Approval of the compensation of our named executive officers as described under "Executive Compensation" in this proxy statement.	The proposal will be considered approved if more votes are cast in favor than against.
• To recommend whether future stockholder votes on the compensation of our named executive officers should be held every one, two or three years.	The choice that receives a plurality of the votes cast will be considered the stockholders' recommendation, although it will not be binding on our Board of Directors.

Abstentions. Abstaining from voting for a nominee in the election of directors or on any of the other proposals will reduce the number of votes cast as well as the number of votes in favor, so will have no impact on the results of voting.

Broker non-votes. A broker non-vote occurs when a broker cannot vote a customer's shares registered in the broker's name because the customer did not send the broker instructions on how to vote on the matter and the broker is barred by law or stock exchange regulations from exercising its discretionary voting authority in the particular matter. Brokers will have voting discretion for shares registered in their own name on the proposal to ratify the appointment of our independent auditors, but not in the election of directors or the other proposals. Broker non-votes will not be included in the votes cast, so will have no impact on the results of voting with respect to the election of directors and the other proposals.

Discretionary voting by proxies on other matters. Aside from the proposals for the election of directors, the ratification of our selection of auditors and the advisory votes on executive compensation, we do not know of any other proposals that may be presented at the 2011 annual meeting. If another matter is properly presented for consideration at the meeting, the persons named in the accompanying proxy card will exercise their discretion in voting on the matter.

How you may revoke your proxy. You may revoke the authority granted by your executed proxy card at any time before we exercise it by filing with our Corporate Secretary, Lynnette C. Fallon, a written revocation or a duly executed proxy card bearing a later date, or by voting in person at the meeting. If your shares are held in a brokerage account, you must make arrangements with your broker or bank to revoke your proxy.

Expenses of solicitation. We will bear all costs of soliciting proxies. We will upon request reimburse brokers, custodians and fiduciaries for out-of-pocket expenses incurred in forwarding proxy solicitation materials to the beneficial owners of stock held in their names. In addition to solicitations by mail, our directors, officers and employees may solicit proxies from stockholders in person or by other means of communication, including telephone, facsimile and e-mail, without additional remuneration. We may retain a proxy solicitation firm to assist in the solicitation of proxies. We will bear all reasonable fees and expenses if such a firm is retained.

Householding of Annual Meeting Materials. Some banks, brokers and other nominee record holders may be "householding" our proxy statements and annual reports. This means that only one copy of our proxy statement and annual report to stockholders may have been sent to multiple stockholders in your household. We will promptly deliver a separate copy of either document to you if you call or write us at the following address or telephone number: Axcelis Technologies, Inc., 108 Cherry Hill Drive, Beverly, Massachusetts 01915, Attn: Corporate Secretary, telephone: (978) 787-4000. If you want to receive separate copies of the proxy statement or annual report to stockholders in the future, or if you are receiving multiple copies and would like to receive only one copy per household, you should contact your bank, broker, or other nominee record holder, or you may contact us at the above address and telephone number. Our annual report is also available on our website at www.axcelis.com.

SHARE OWNERSHIP OF 5% STOCKHOLDERS

The following table shows the amount of our common stock beneficially owned as of December 31, 2010 by persons known by us to own more than 5% of our common stock.

Beneficial Owner(1)	Shares Owned	Percent of Class
Donald Smith & Co., Inc.(2) 152 West 57 th Street, New York, NY 10019	10,053,282	9.50%
Sterling Capital Management LLC(3) 4064 Colony Road, Suite 300, Charlotte, NC 28211	9,645,407	9.12%
FMR LLC and Edward C. Johnson 3d(4) 82 Devonshire Street, Boston, MA 02109	5,600,939	5.29%
BlackRock, Inc.(5) 40 East 52 nd Street, New York, NY 10022	5,291,664	5.0%

- (1) Unless otherwise noted, the number of shares beneficially owned by each person listed includes any shares over which a person has sole or shared voting or investment power. The percentage ownership of each person listed in the table was calculated using the total number of shares outstanding on December 31, 2010 (105,786,423 shares).
- (2) Based on a Schedule 13G filed with the Securities and Exchange Commission in February 2011 reporting on ownership as of December 31, 2010, which states that such shares are owned by advisory clients of Donald Smith & Co., Inc. According to the Schedule 13G, Donald Smith & Co., Inc. has sole voting power over 7,683,000 of such shares and the sole power to dispose of all of such shares. According to the Schedule 13G, Donald Smith Value Fund, L.P., Donald Smith Long/Short Equities Fund, L.P. and Velin Mezinev each have sole dispositive power over all the shares reported in the table and sole voting power over 287,600, 33,382, and 18,300 of such shares, respectively.
- (3) Based on a Schedule 13G/A filed with the Securities and Exchange Commission in January 2011 reporting on ownership as of December 31, 2010. This filing states that such shares are owned by advisory clients of Sterling Capital Management LLC.
- (4) Based on a Schedule 13G/A filed with the Securities and Exchange Commission in February 2011 reporting on ownership as of December 31, 2010, which states that such shares are held in client accounts managed by investment advisor subsidiaries of FMR LLC. According to the Schedule 13G/A, Edward C. Johnson 3d and FMR LLC, through their control of such subsidiaries, each have sole dispositive power over all the shares reported in the table and sole voting power over 4,000,000 of such shares.
- (5) Based on a Schedule 13G filed with the Securities and Exchange Commission in February 2011 reporting on ownership as of December 31, 2010. This filing states that BlackRock, Inc. is a holding company whose investment management subsidiaries acquired the shares reported.

SHARE OWNERSHIP OF DIRECTORS AND EXECUTIVE OFFICERS

The following table shows the amount of our common stock beneficially owned as of March 1, 2011 by our directors, the executive officers named in the Summary Compensation Table below, and all of our current executive officers and directors as a group.

<u>Beneficial Owner(1)</u>	<u>Shares Owned</u>	<u>Shares Subject to Exercisable Rights to Acquire as of April 29, 2011</u>	<u>Total Shares Beneficially Owned</u>	<u>Percent of Class</u>
<i>Non-Executive Directors</i>				
Edward H. Braun	0	—	—	*
R. John Fletcher	79,185	155,000	234,185	*
Stephen R. Hardis	597,920	176,000	773,920	*
William C. Jennings	77,185	155,000	232,185	*
Patrick H. Nettles	63,685	185,000	248,685	*
H. Brian Thompson	84,185	185,000	269,185	*
Geoffrey Wild	43,712	140,000	183,712	*
<i>Named Executive Officers</i>				
Mary G. Puma(2)	262,133	712,500	974,633	*
Matthew Flynn	62,986	90,321	153,307	*
Stephen G. Bassett(3)	111,815	267,612	379,427	*
Lynnette C. Fallon	122,191	265,250	387,441	*
Kevin J. Brewer	80,887	131,965	212,852	*
<i>All current Executive Officers and Directors as a Group (14 persons)(4)</i>				
	1,627,331	2,509,398	4,136,729	3.81%

* Indicates less than 1%.

- (1) Unless otherwise noted, the number of shares beneficially owned by each person listed includes any shares over which the person has sole or shared voting or investment power. The shares shown in the table also include shares that the persons named in this table have the right to acquire on or before April 29, 2011 (60 days after March 1, 2011) by exercising a stock option or other right. Unless otherwise noted, each person has sole investment and voting power (or shares that power with his or her spouse) over the shares listed in the table. The percentage ownership of each person listed in the table was calculated using the total number of shares outstanding on March 1, 2011 (105,981,484 shares), plus any shares that person could acquire upon the exercise of any options or other rights on or before April 29, 2011.
- (2) Ms. Puma's ownership includes 20,000 shares owned by her husband.
- (3) Mr. Bassett's Shares Subject to Exercisable Rights to Acquire as of April 29, 2011 reflects the vesting of options and the issuance of shares on vesting of restricted stock units expected to occur on March 31, 2011 in accordance with the provisions of his Executive Retirement Agreement dated January 17, 2011.
- (4) Includes shares and exercisable options held by the directors and named executive officers, as well as two other executive officers who beneficially own an aggregate of 41,447 shares and 45,750 exercisable options.

PROPOSAL 1: ELECTION OF DIRECTORS

Our Board of Directors has fixed the number of directors at eight. The number of directors is subject to increase or decrease by action of the Board. Under a 2009 charter amendment, the Company commenced a three year phase out of its classified Board commencing at the 2010 Annual Meeting and ending at the 2012 Annual Meeting. At the 2011 annual meeting, six directors will be elected to hold office for a term of one year until our annual meeting in 2012 and until their successors are elected and qualified. Each of the Board's nominees has consented to serve if elected. However, if any nominee is unable to serve, proxies will be voted for any other candidate nominated by the Board. The Board recommends a vote FOR each of the six nominees.

The following table contains biographical information about the nominees for director and current directors whose term of office will continue after the meeting.

Nominees for Election in 2011

<u>Name and Age</u>	<u>Business Experience and Other Directorships</u>	<u>Director Since</u>
Stephen R. Hardis Age: 75	Mr. Hardis was the Company's Chairman of the Board until May 2006 and currently serves as Lead Director. He was Chairman and Chief Executive Officer of Eaton Corporation, a global industrial manufacturer, until July 2000. Mr. Hardis became Eaton's Chairman in January 1996 and its Chief Executive Officer in September 1995. Prior to that, he served as Eaton's Vice Chairman from 1986 and its Executive Vice President—Finance and Administration from 1979. Mr. Hardis is a director of Lexmark International Group, Inc., Marsh & McLennan Companies, Inc., and Progressive Corporation, and during the past five years, he was also a director of American Greetings Corporation, Nordson Corporation, and Steris Corporation.	2000
Patrick H. Nettles Age: 67	Mr. Nettles has served as Executive Chairman of the Board of Directors of CIENA Corporation, a manufacturer of optical networking equipment, since May 2001. Prior to that, Mr. Nettles served as Chairman of the Board of Directors and Chief Executive Officer of CIENA from October 2000, as its President, Chief Executive Officer and Director from April 1994, and as its Director and Chief Executive Officer from February 1994. Mr. Nettles is a director of Progressive Corporation.	2001

<u>Name and Age</u>	<u>Business Experience and Other Directorships</u>	<u>Director Since</u>
H. Brian Thompson Age: 71	Mr. Thompson is Executive Chairman of Global Telecom & Technology (GTT), a global telecommunications network integrator. Mr. Thompson continues to head his own private equity investment and advisory firm, Universal Telecommunications, Inc. From December 2002 to June 2007, Mr. Thompson was Chairman of Comsat International, one of the largest independent telecommunications operators serving all of Latin America. He also served as Chairman and Chief Executive Officer of Global TeleSystems Group, Inc. from March 1999 through September of 2000. Mr. Thompson was Chairman and CEO of LCI International from 1991 until its merger with Qwest Communications International Inc. in June 1998. He became Vice Chairman of the board for Qwest until his resignation in December 1998. He previously served as Executive Vice President of MCI Communications Corporation from 1981 to 1990, and prior to MCI, was a management consultant with the Washington, DC offices of McKinsey & Company for nine years, where he specialized in the management of telecommunications. He currently serves as a member of the board of directors of ICO Global Communications (Holdings) Ltd, Penske Automotive Group, and Sonus Networks, Inc., and during the past five years he was also a director of Mercator Partners Acquisition Corporation, Bell Canada International, Inc. ArrayComm, Inc. and United Auto Group.	2002
R. John Fletcher Age: 65	Mr. Fletcher is Chief Executive Officer of Fletcher Spaght, Inc., a strategy consulting organization, which he founded in 1983, and Managing Director of Fletcher Spaght Ventures, a venture capital fund. Prior to founding Fletcher Spaght, Inc., Mr. Fletcher was a Manager at the Boston Consulting Group. Mr. Fletcher is also a director of The Spectranetics Corporation, and during the past five years, he was also a director of AutoImmune, Inc. and Panacos, Inc.	2003
Geoffrey Wild Age: 54	Mr. Wild is Chief Executive Officer of AZ Electronic Materials plc., a position he has held since early 2010. AZ Electronic Materials is a provider of high-purity, advanced technology products for use in integrated circuits and devices, flat panel displays and photolithographic printing. Prior to that, from January 2008 he was Chief Executive Officer and President of Cascade Microtech, Inc., a supplier of semiconductor wafer measurement and test probes. Prior to that, from 2002 through 2007, Mr. Wild was Chief Executive Officer and President of Nikon Precision, Inc., a supplier of lithography systems. Prior to joining Nikon, Mr. Wild was Chief Executive Officer of TheSupply, Inc., an e-commerce provider of supply chain services and he previously also ran the electronic materials businesses of AlliedSignal and Johnson Matthey. Mr. Wild served as a director of Nikon Precision, Inc. until the end of 2007.	2006

<u>Name and Age</u>	<u>Business Experience and Other Directorships</u>	<u>Director Since</u>
Edward H. Braun Age: 71	Edward H. Braun is Chairman of Veeco Instruments, Inc., a maker of equipment to manufacture LEDs, solar panels, hard disk drives and other devices, a position he has held since 1990. Until July 2007, Mr. Braun was also Chief Executive Officer of Veeco. Prior to 1990, Mr. Braun held numerous executive positions, beginning in 1966, at a company acquired by Veeco in 1990. Mr. Braun is a Director Emeritus of Semiconductor Equipment and Materials International (SEMI), a trade association, of which he was Chairman of the Board in 1993, and is a director of Cymer, Inc., a supplier of excimer laser light sources used in deep ultra-violet photolithography systems.	2011

Continuing Directors with Terms Expiring in 2012

<u>Name and Age</u>	<u>Business Experience and Other Directorships</u>	<u>Director Since</u>
William C. Jennings Age: 71	Mr. Jennings is a retired partner of PricewaterhouseCoopers LLP, a global accounting and advisory firm, where he led the risk management and internal control consulting practice from 1992 until his retirement in 1999. Before that, Mr. Jennings served as a senior audit partner at Coopers & Lybrand, as a senior executive vice president at Shearson Lehman Brothers, responsible for quality assurance, internal audit and compliance, and as an executive vice president and chief financial officer of Bankers Trust. Since retiring from PricewaterhouseCoopers, Mr. Jennings has provided independent consulting services to a number of companies. He is a director of Silgan Holdings Inc., and The Spectranetics Corporation, and during the past five years, he was also a director of Nyfix, Inc.	2003
Mary G. Puma Age: 53	Ms. Puma is Axcelis' Chairman (since May 2006), Chief Executive Officer (since January 2002) and President (since May 2000). Prior to becoming Chief Executive Officer, Ms. Puma served as Chief Operating Officer from May 2000, and, before that, served as a Vice President of the Company from February 1999. In 1998, she became General Manager and Vice President of the Implant Systems Division of Eaton Corporation, a global diversified industrial manufacturer. In May 1996, she joined Eaton as General Manager of the Commercial Controls Division. Prior to joining Eaton, Ms. Puma spent 15 years in various marketing and general management positions for General Electric Company. Ms. Puma is also a director of Nordson Corporation and of Semiconductor Equipment and Materials International (SEMI), a trade association.	2000

Experience, Qualifications Attributes of the Nominees and Continuing Directors

The specific experience, qualifications, attributes or skills of the nominees, as well as the other directors continuing in office, that led to the conclusion that each of these individuals should serve as a director of the Company, in light of our business and structure, are:

Nominees

- Mr. Hardis' work experience as a chief executive officer and chief financial officer of a global capital equipment business gives him the skills to provide leadership and guidance to management and the other Board members with respect to financial and operational matters affecting Axcelis. In addition, Mr. Hardis' experience on other public company boards of directors has exposed him to broad experience in corporate governance matters that has benefited our board. Finally, Mr. Hardis' experience with our business when it was owned by Eaton Corporation has provided our Board with a historical context in which to address issues relating to our business and products. Mr. Hardis has served as Lead Director since May 2006 (prior to which he was Chairman beginning in 2000), and also serves on both the Compensation Committee and Nominating and Governance Committee since those committees were formed in 2000 and 2002, respectively. The Board highly values his contributions in these roles.
- Mr. Nettles' work experience as a chief executive officer and chief financial officer of a global capital equipment business gives him the skills to provide leadership and guidance to management and the other Board members in respect to the financial and operational matters affecting Axcelis. Mr. Nettles has also had meaningful experience in corporate transactions, especially in the area of mergers and acquisitions, which has been helpful to management and the other Board members in recent years and may be beneficial in the future. Mr. Nettles has served as chairman of the Board's Nominating and Governance Committee since its formation in 2002 and the Board has benefited from his strong leadership in that area.
- Mr. Thompson's work experience leading a number of companies in the telecom industry gives him the skills to provide leadership and guidance to management and the other Board members in respect to the financial and operational matters affecting Axcelis. Mr. Thompson has also had significant experience in corporate transactions, especially in the capital markets, which has been helpful to management and the other Board members in recent years and may be beneficial in the future. Mr. Thompson has served as chairman of the Board's Compensation Committee since October 2002 and the Board has benefited from his strong leadership in that area.
- Mr. Fletcher's work experience gives him extensive experience in strategic planning, especially in the area of market analysis for technology-based businesses, which has been beneficial to the Board's understanding of the Company's business opportunities. Mr. Fletcher's work also provides him with insight into capital formation matters which may be beneficial in the future. Mr. Fletcher has served on the Compensation Committee since May 2006 and on the Audit Committee since April 2004. The Board highly values his contributions in these roles.
- Mr. Wild's work experience provides him with an understanding of the semiconductor industry and the role of a supplier of equipment and materials to these international customers, who are largely based in Asia. Mr. Wild's role as chief executive officer has exposed him to operational and financial and accounting issues which are relevant to the Company's business. Mr. Wild has served as a member of the Audit Committee since joining the Board in 2006 and the Board has benefited from his continuing service on that committee.
- Mr. Braun's work experience is very relevant to the issues addressed by Axcelis management relating to customer requirements for capital equipment for the semiconductor and other adjacent industries, such as solar and LED. Mr. Braun's work as a chief executive officer of

Veeco has exposed him to issues relating to complex manufacturing, world-wide capital equipment markets and global outsourcing as well as business development and finance matters.

Continuing Directors

- Mr. Jennings' work experience in accounting, risk management and internal controls gives him the skills needed to lead the Board's audit committee, which he has done since joining the Board in 2003. His role as a senior executive at two financial institutions also gives him the skills to provide leadership and guidance to management and the other Board members in respect to the financial and operational matters affecting Axcelis. Mr. Jennings has served as chairman of the Board's Audit Committee since April 2004 and as a member since June 2003 and the Board has benefited from his strong leadership in that area. Mr. Jennings temporarily served as chief executive officer of U.S. Interactive, Inc. from September 2000 until November 2000, which company filed for bankruptcy protection in January 2001.
- Ms. Puma's long experience in our industry, as well as her role as Axcelis' chief executive officer and president allow her to provide essential insight into the Company's past and current business operations which is critical to the Board's decision-making in all financial and operational matters affecting Axcelis. Ms. Puma's strong leadership during challenging periods of the Company's history, notably her oversight of a complete revitalization of the Company's product lines while implementing substantial cost reductions, have been highly valued by the Board.

PROPOSAL 2: RATIFICATION OF THE APPOINTMENT OF OUR INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Upon the recommendation of its Audit Committee, the Board of Directors has appointed the independent registered public accounting firm of Ernst & Young LLP as independent auditors to conduct the annual audit of our financial statements for 2011 and is seeking stockholder ratification of the appointment. Ernst & Young LLP is an internationally recognized independent registered public accounting firm that audited the Company's financial statements in 2010 and which the Audit Committee believes is well qualified to continue.

Representatives of Ernst & Young are expected to attend the annual meeting and be available to respond to appropriate questions. They will also have the opportunity to make a statement if they desire.

The aggregate fees billed for each of the last two fiscal years for professional services rendered by Ernst & Young LLP were as follows:

	<u>2009</u>	<u>2010</u>
Audit Fees	\$ 1,728,077	\$ 1,361,500
Audit Related Fees	\$ 15,300	\$ 19,500
Tax Fees		
Tax compliance and preparation of returns	\$ 91,133	\$ 156,378
International tax planning	\$ 85,068	\$ 89,379
General tax planning and other tax services	\$ 13,244	\$ 105,000
Total Tax Fees	<u>\$ 189,445</u>	<u>\$ 350,757</u>
Total Fees	<u>\$ 1,932,822</u>	<u>\$ 1,731,757</u>

Audit fees include statutory audits for subsidiaries and branches operating in countries outside of the United States. Audit related fees include the audit for the Company's 401(k) plan required under ERISA. International tax planning relates to the setting of fair compensation for services provided to us by our foreign subsidiaries to ensure appropriate revenue levels are reported for taxation in those foreign countries.

Under the Audit Committee's charter, the Audit Committee must pre-approve the fees to be paid to the independent auditor for audit services. In addition, the Audit Committee has adopted a policy requiring the Committee's pre-approval of all audit-related or non-audit (including tax) services performed by the independent auditor in order to assure that these services do not impair the auditor's independence. The policy prohibits the independent auditor's performance of certain types of services as inconsistent with independence.

Any approval required under the policy must be given by the Audit Committee or by any member or members to whom the Committee has delegated that authority. The Audit Committee does not delegate its responsibility to approve services performed by the independent auditor to any member of management.

The standard applied by the Audit Committee in determining whether to grant approval of any type of non-audit service, or of any specific engagement to perform a non-audit service, is whether the services to be performed, the compensation to be paid therefor and other related factors are consistent with the independent auditor's independence under guidelines of the Securities and Exchange Commission, the Public Company Accounting Oversight Board and applicable professional standards. Relevant considerations include whether the work product is likely to be subject to, or implicated in, audit procedures during the audit of our financial statements, whether the independent auditor would be functioning in the role of management or in an advocacy role, whether the independent auditor's performance of the service would enhance our ability to manage or control risk or improve audit quality, whether such performance would increase efficiency because of the independent auditor's familiarity with our business, personnel, culture, systems, risk profile and other factors, and whether the amount of fees involved, or the proportion of the total fees payable to the independent auditor in the period that is for non-audit services, would tend to reduce the independent auditor's ability to exercise independent judgment in performing the audit.

All of the non-audit services rendered by Ernst & Young LLP in respect of the 2009 and 2010 fiscal years were pre-approved by the Audit Committee in accordance with this policy.

Ernst & Young LLP informed the Company that they are not aware of any relationship with the Company that, in their professional judgment, may reasonably be thought to bear on the independence of Ernst & Young LLP.

Ratification of the appointment of Ernst & Young LLP by the stockholders is not required by law or by our bylaws. The Board of Directors is nevertheless submitting it to the stockholders to ascertain their views. If this proposal is not approved at the annual meeting by the affirmative vote of holders of a majority of the votes cast at the meeting, the Audit Committee intends to reconsider its recommendation of Ernst & Young LLP as independent auditors. The Company may retain the firm for 2011 notwithstanding a negative stockholder vote.

The Board of Directors recommends a vote FOR ratification of the appointment of Ernst & Young LLP.

PROPOSAL 3: ADVISORY VOTE REGARDING EXECUTIVE COMPENSATION

This proposal, commonly known as "Say on Pay," asks the stockholders to approve the compensation of the Company's named executive officers as described under "Executive Compensation" below in this proxy statement.

The Company's compensation goals are to (i) retain executive talent by offering base pay that is commensurate with pay at other companies of a similar size in the same or similar industries, as adjusted for individual factors, and (ii) drive achievement of annual strategic goals by rewarding executives through incentives tied to these goals. Details of the 2010 compensation provided to the named executive officers are in "Compensation Discussion and Analysis" and the accompanying tables and narrative under "Executive Compensation." 2010 executive compensation reflects the Company's excellent year-over-year revenue growth and bottom-line improvement.

The vote solicited by this proposal is advisory and its outcome will not be binding on the Board nor require the Board to take any action. Moreover, the outcome of the vote will not be construed as overruling any decision of the Board or creating or implying any additional fiduciary duty of the Board. However, the Board expects to take into account the outcome of this vote when considering future compensation arrangements for the Company's named executive officers.

The proposal will be considered approved at the annual meeting if more votes are cast in favor than against. Abstentions and broker non-votes will not count as votes cast for or against this proposal.

The Board of Directors recommends a vote FOR approval of the compensation of the Company's named executive officers.

PROPOSAL 4: ADVISORY VOTE REGARDING THE FREQUENCY OF STOCKHOLDER VOTES TO APPROVE EXECUTIVE COMPENSATION

The Board also seeks the views of the stockholders on how often the Company should ask the stockholders to vote on the compensation of the Company's named executive officers: each year, every two years or every three years. The Company is required by Section 14A of the Securities Exchange Act of 1934 to include a Say on Pay vote, like Proposal 3, in proxy statements for its annual meetings at least once every three years, and also to seek periodic advisory votes on how often there should be a Say on Pay vote.

The Board believes that the Say on Pay vote should be held annually. The Board evaluates, adjusts and approves executive compensation each year. Permitting the stockholders to express their opinion as close in time to the relevant compensation decisions will be most useful to the Board.

Because the vote solicited by this proposal is advisory, its outcome will not be binding on the Board nor require the Board to take any action. Moreover, the outcome of the vote will not be construed as overruling any decision of the Board or creating or implying any additional fiduciary duty of the Board or restricting or limiting the ability of the Company's stockholders to make proposals for inclusion in proxy materials related to executive compensation. However, the Board expects to take into account the outcome of this vote when considering how frequently to seek a Say on Pay vote of stockholders in the future.

Only votes cast at the annual meeting will be taken into account. Abstentions and broker non-votes will not count as votes cast with respect to this proposal.

The Board of Directors recommends a vote in favor of the Company's including a Say on Pay proposal in the proxy statement for its annual meeting ANNUALLY.

EXECUTIVE COMPENSATION

2010 Compensation Discussion and Analysis

This Compensation Discussion and Analysis is intended to provide a context for the disclosures contained in this Proxy Statement with respect to the compensation paid to the Company's principal executive officer (Mary G. Puma), principal financial officer (Stephen G. Bassett), and the three most highly compensated other executive officers serving as executive officers at December 31, 2010 included in the Summary Compensation Table below. These executive officers are referred to herein as "named executive officers" or "NEOs." Specifically, this Compensation Discussion and Analysis will explain the objectives and material elements of the compensation of the NEOs during 2010.

Compensation Principles and Tools

The Company's executive compensation program is designed to:

- (1) retain executive talent by offering compensation that is commensurate with pay at other companies of a similar size in the same or similar industries, as adjusted for individual factors; and
- (2) drive achievement of annual strategic goals by rewarding executives through incentive pay tied to approved financial and operational goals.

All executive compensation is determined by the Compensation Committee of the Board of Directors. For a discussion of the Committee's processes in general, see "Corporate Governance—Compensation Committee" elsewhere in this Proxy Statement. Executive compensation for incumbent executives is reviewed annually.

In past years, the Committee has engaged a compensation consultant on an annual basis to provide market-based compensation information for each of the executive officer positions at Axcelis. Since the Committee did not anticipate any market-based executive officer compensation adjustments in 2010 in light of our financial position and performance, the Committee did not retain a compensation consultant for this purpose in 2010. In years where the Committee is considering compensation adjustments, such market data would be used by the Committee, together with recommendations from the Chief Executive Officer. In connection with the 2010 equity grants discussed below, the Committee did consider (a) information from general compensation surveys reporting on high technology companies and semiconductor and semi equipment firms and (b) equity grant information reported in recent proxy statements by ten companies that had been identified as peers in a 2007 Pearl Meyer compensation report (Advanced Energy Industries, Asyst Technologies, ATMI Inc., Brooks Automation Inc., Cabot Microelectronics Corp., Cymer Inc., Mattson Technology Inc., MKS Instruments Inc., Photronics Inc., Teradyne Inc. and Varian Semiconductor Equipment Associates, Inc.), as discussed in the proxy statement for our 2008 annual meeting.

In 2010, the Compensation Committee reviewed all elements of each NEO's compensation in the context of each executive's total compensation. This was done by reviewing comprehensive reports on each executive's current and historical base and annual incentive cash compensation, equity portfolio and contractual arrangements with the Company.

Material Elements of Named Executive Officer Compensation

The key elements of NEO compensation are: base salaries; an annual cash incentive program; equity compensation; and a "double-trigger" Change of Control Agreement. Executives also may participate, on the same terms as all other employees, in an Employee Stock Purchase Plan, a 401(k) retirement savings plan and health and welfare benefits.

The following discussion seeks to explain why Axcelis has chosen to pay each compensation element, how Axcelis determines the amount of each element, and how the element and the

Company's decisions regarding that element in 2010 fit into the Company's overall compensation objectives and affect decisions regarding other elements.

Base Salary. The Company pays a base salary to each of its NEOs. The objective is to provide base compensation to the executive that is competitive with base compensation the executive could earn in a similar position at other companies, because Axcelis believes that this is necessary to attract and retain suitably qualified executives. Base pay for NEOs is set on commencement of employment with the Company and annually reviewed thereafter. In the event that base pay is a factor in calculating annual incentive cash compensation or equity grants, when fixing or adjusting base pay, the Compensation Committee will consider the impact of a change on these other compensation components.

CEO Base Pay in 2010. In May 2009, Ms. Puma proposed to the Compensation Committee that, notwithstanding the terms of her employment agreement with the Company, her annual base pay be temporarily reduced during 2009 and 2010 to \$400,000. On May 6, 2009, the Compensation Committee accepted this modification to her employment agreement, with the condition that in the event that Ms. Puma is at any time entitled to separation pay under her employment agreement or under her Change of Control Agreement, all amounts due to her shall be calculated as if the modifications had never taken effect. Accordingly, Ms. Puma's base compensation for 2010 was \$400,000, reflecting a 20% reduction to the base compensation set in her employment agreement.

2010 Base Pay for the Other NEOs. As of January 1, 2010, the annual rate of base pay for each NEO other than Ms. Puma reverted to the respective level last approved by the Compensation Committee prior to the 15.4% reduction during 2009 as a result of eight weeks of unpaid leave. At its meeting in August 2010, the Compensation Committee reviewed the cash compensation of each NEO. Given the Company's difficult financial performance during 2010, no adjustments to base compensation were proposed to or approved by the Compensation Committee during 2010.

Annual Cash Incentive. Axcelis usually offers an annual cash incentive target as part of executive compensation to place a portion of compensation at risk in order to incent the executive to achieve specific company goals. Although executives understand that the payout under a cash incentive program will depend on the Company's performance overall and the executive's individual performance, the stated cash incentive target for a particular position is an important part of a competitive compensation package to attract and retain executives.

2009 Cash Incentive. Given the Company's financial performance and condition during 2009, the Compensation Committee did not implement any cash incentive for NEOs in respect of the Company's performance during 2009. As part of the modification discussed above, Ms. Puma agreed to forgo any cash incentive for 2009.

2010 Cash Incentive. In February 2010, the Compensation Committee adopted an annual incentive plan, called the 2010 Axcelis Management Incentive plan, in which the NEOs participated. The Committee set a target payout for each NEO of \$30,000 under the 2010 Axcelis Management Incentive plan. As a result of the Company's financial position, this target payout was intentionally set below the Committee's understanding of targets in comparable companies for these positions. Given the below-market targets for each of the NEOs, the 2010 Axcelis Management Incentive plan did not incorporate an individual performance multiplier in calculating the final payout.

The actual payout under the 2010 Axcelis Management Incentive plan could range from 0% to 200% of the target payout, based on a company performance score based on the achievement of three financial metrics, 2010 revenues, year-end cash from operations and 2010 operating expense. The plan established a 0%, 100% and 200% score for each of the metrics. Each metric was individually weighted, so that the scored, weighted metrics would be totaled for a final score. The Committee chose these

metrics because they were critical to the Company's financial performance during 2010. The 100% target for each metric reflected the expected results if the Company was able to execute on its 2010 profit plan, which provided for 71% revenue growth over 2009. The plan also permitted the Committee to consider factors relating to the quality of the financial results (such as sources of revenue, whether operational improvements impacted gross margin, and whether certain types of investment impacted earnings) as well as the actual quantitative results.

Because revenue growth was essential to the success of the profit plan, the revenues metric was weighted 50%. Each of the cash balance and expense metrics were weighted 25%, but the plan provided that the expense metric would have 0% weighting if the revenue metric exceeded a 100% score, since the expense targets would be inappropriate standards if revenues were substantially higher than expected. In that case, the weighting on the cash metric increased to 50%. This occurred in 2010, since revenues were \$275.3M, exceeding the 200% score revenue target. Accordingly, the year-end cash from operations and 2010 revenue metrics are set forth below, along with the Company's actual results in 2010 and resulting scoring for the 2010 Axcelis Management Incentive plan.

Score	Minimum 0%	Target 100%	Maximum 200%	Weight	Actual Results	Score	Weighted Score
Cash from Operations at							
Year End 2010	\$ 45M	\$ 50M	\$ 60M	50%	\$ 45.9M	18%	9%
2010 Revenue	\$ 215M	\$ 228M	\$ 250M	50%	\$ 275.3M	200%	100%

On January 24, 2011 our Board of Directors approved a company performance score of 150% for the 2010 Axcelis Management Incentive plan, exercising their discretion to increase the payout based on qualitative performance. This score reflects an on-target 100% score on the cash metric which, after weighting and combining with the 200% score on revenues, resulted in an overall score of 150%. The Board determined that this score was appropriate in light of the cash requirements to fund the significant 2010 ramp in material purchasing for systems, which was also reflected in the above-plan year-end accounts receivable. Accordingly, each of the NEOs received a payout under the 2010 Axcelis Management Incentive plan equal to \$45,000, as disclosed in the 2010 Summary Compensation Table below.

Long Term Incentive Compensation through Equity. The Compensation Committee also grants the NEOs equity compensation under the 2000 Stock Plan. Equity compensation for NEOs, which has taken the form of stock options and restricted stock units, is designed to align the interests of executives with those of our investors and to retain executives during multi-year vesting periods. Equity grants are a key retention device as a result of vesting provisions which typically extend over four years. Long term ownership of equity awards is further encouraged through the Company's executive stock ownership guidelines, which establish a minimum number of shares that the executive must own. During 2010, these guidelines required ownership ranging from 20,000 shares in the case of Ms. Puma to 12,000 shares in the case of the other NEOs. These guidelines were intended to insure that the executives' interest in the value of the Company's stock was not limited to stock price appreciation via options without a downside.

Equity grants are also intended to drive performance, in that the value ultimately realized is linked to stock price appreciation. Option grants have no value without stock price appreciation, and restricted stock units have value at grant that can increase with stock price appreciation. Thus, equity grants should constructively influence management's motivation to enhance the value of the Company's stock. Equity grants to executives are made upon hire and, typically, thereafter on an annual basis. Annual equity grants to executive officers have been made in most years in order to ensure a meaningful retentive effect by maintaining the percentage of the executive's equity position that is unvested.

The Compensation Committee determines the form of equity grants made to the NEOs. The 2000 Stock Plan permits the Compensation Committee to award several different forms of equity rights,

including restricted stock, restricted stock units, incentive stock options and non-qualified stock options. Past equity grants to NEOs have taken the form of non-qualified stock options and restricted stock units. It is the Committee's general practice to approve equity awards with a future effective date, usually on the 15th of the month following the approval. The Company believes that this time period between the approval and effectiveness of an equity grant means that the Committee is unable to know or estimate the trading price of the Company's common stock on the effective date of grant. As a result, the Committee has not, to date, thought it necessary to adopt a policy of timing the approval or effectiveness of equity awards to specific dates following the release of financial results or other material information.

2010 Restricted Stock Units in Lieu of Cash Payout under the 2008 Axcelis Team Incentive Plan. In February 2010, the Compensation Committee approved the payout of the 2008 Axcelis Team Incentive Plan to the participants other than Ms. Puma, who had declined her payout. The Compensation Committee had determined in early 2009 that the company performance score for the 2008 Axcelis Team Incentive Plan was 32%, based on financial and operational goals that were described in our 2009 proxy statement. However, the Committee deferred a determination of the NEOs' individual performance scores as well as payout under the plan due to the Company's financial position. In February 2010, the Compensation Committee determined the individual performance score for the NEOs under this plan. The Committee made this assessment based on each executive's performance during 2008 and 2009, taking into account the Chief Executive Officer's recommendation and the business results in the executive's area of responsibility. The individual performance scores averaged 108% for the NEOs receiving a payout. The officers' incentive targets were multiplied by both the company performance scores and the individual performance score, as described in our 2009 proxy statement, to determine the payout amounts.

For the NEOs and other management employees, the Committee approved payouts under the 2008 Axcelis Team Incentive Plan in the form of restricted stock units, rather than cash as originally contemplated by the plan, in order to help the Company conserve cash. The number of shares of common stock subject to these restricted stock units was determined by dividing the payout amounts due to each NEO by the closing price of the Company's common stock on February 16, 2010. These restricted stock units were subject to vesting, conditioned on continued employment, on November 12, 2010. These grants are disclosed in the 2010 Summary Compensation Table and in the Grants of Plan-Based Awards in Fiscal 2010 table below.

2010 Annual Equity Grants. In 2010, the Compensation Committee determined that stock options were an attractive form of equity compensation in light of the Company's depressed stock price. Accordingly, in June 2010, after reviewing the values of each executive's equity portfolio, the Committee approved a stock option grant to each executive officer, including the NEOs. As discussed above, in determining the appropriate size of these option grants, the Committee considered (a) equity compensation values for executive positions in general compensation surveys reporting on high technology companies and semiconductor and semi equipment firms and (b) executive equity grant information reported in recent proxy statements by ten peer companies named above. The 2010 stock option grants to NEOs are set forth in the Grants of Plan Based Awards in Fiscal 2010 table below. In setting the vesting provisions for the stock options grants to the NEOs in 2010 the Committee sought to balance the reward and retentive effects of such equity grants by setting the vest dates for 25% of such shares on each of the next four anniversaries of the grant date.

These grants are exercisable for a number of shares that the Committee considered an appropriate incentive for each of the NEOs to both (1) provide a retentive effect on the executive during the four year vesting period and (2) incentivize the executive to improve Company performance and stock price. In determining the size of these grants, the Committee took into account the Company's total outstanding shares, grants made to non-executive employees and an appropriate total annual burn rate for the Company's equity compensation. The grant date fair values of these grants are lower than available competitive market information might suggest for executives in these positions. If the Committee had been guided by such data and sized the 2010 equity grants using Black-Scholes or another valuation methodology that takes the trading price into account, the grants would have been inappropriately large. Given the depressed stock price at the time of the 2010 option grants, the Committee believes that these grants are of sufficient size to create a meaningful financial incentive.

Puma Employment Agreement

The Company has an Amended and Restated Employment Agreement with Ms. Puma effective November 6, 2007. As discussed above, in 2009, Ms. Puma agreed to modifications to her employment agreement affecting her compensation for 2008, 2009 and 2010. She agreed to reduce her base compensation for 2009 and 2010 by 20%. She also declined any incentive compensation for 2008 or 2009. See below under "Payments on Termination or Change of Control" for a further discussion of Ms. Puma's employment agreement.

Change of Control Agreements

Each of the NEOs has a Change of Control Agreement with the Company, described below under "Payments on Termination or Change of Control." No actions were taken by the Compensation Committee in 2010 relating to the Change of Control Agreements.

Other Compensation Components

In order to encourage our executives to obtain adequate financial and tax planning assistance, Axcelis reimburses up to \$5,500 of an executive's annual tax and financial planning expenses. This program is the only executive perquisite at Axcelis and amounts paid to NEOs under this program are included in the "All other compensation" column in the Summary Compensation Table.

Executives may elect to make contributions to a retirement account in the Company's IRC Section 401(k) plan, which is available to all employees and under which the Company made a matching contribution to each participant in 2008. The Company eliminated the 401(k) plan matching contribution in 2009, and did not provide a match in 2009 or 2010. For 2008, the matching contribution under the 401(k) Plan was the greater of (1) 100% of the employee's pre-tax contributions to the plan, capped at \$1,000, or (2) 50% of the employee's pre-tax contributions to the plan, up to the first 6% of eligible pre-tax compensation contributed to the plan. The Company's matching contributions to the accounts of the NEOs under the 401(k) plan are shown in the "All other compensation" column in the Summary Compensation Table.

NEOs may also participate in the Company's medical and dental insurance offerings by electing to make payroll deductions designed to cover approximately 25% of the cost of those programs (the Company covers the other 75% of the cost). The Company provides life, accidental death and dismemberment and disability insurance for all employees, and the opportunity to increase coverage levels via payroll deductions. Finally, the Company maintains the Employee Stock Purchase Plan, an IRC Section 423 plan, a voluntary plan in which employees may purchase Axcelis shares through salary deductions.

Risk Assessment of Compensation Policies and Practices

The Company has determined that its compensation policies and practices for its employees, including the NEOs, do not give rise to risks that are reasonably likely to have a material adverse effect on the Company. In reaching this determination, management engaged in (i) a review of the Company compensation program's policies and practices, (ii) identification of risks, if any, related to the programs, (iii) consideration of the materiality of a potentially risk-related reward to the total compensation provided to the individual, and (iv) identification of those aspects of the program and its oversight that provide risk control. Although all compensation programs were considered, management's review focused on the programs with variability of payout and in which there is a potential for the participant to directly affect payout.

Based on this review, management determined that the compensation policies and practices for Axcelis' employees do not create risks that are reasonably likely to have a material adverse effect on the Company, principally because:

- (1) Base pay is a material component of all employees' total compensation package, so those employees who receive incentive compensation have a total compensation package that is balanced; and
- (2) Our incentive compensation programs are subject to appropriate risk controls in their design and oversight:
 - The Company's internal controls and risk management practices restrict risk-taking that is not consistent with senior management's determinations on appropriate risk;
 - Payment of small bonuses for extraordinary effort or for achieving individual or team goals are subject to approval by direct managers, and representatives of human resources and finance departments, and, for higher amounts, a representative of senior management;
 - Payment of sales commission plans are subject to calculation and approval by the finance department and are tied to actual receipt of payments from the customer;
 - The Company's annual cash incentive plans have a balanced array of performance measures established by the Compensation Committee of the Board of Directors and which include both qualitative and quantitative assessments of performance;
 - Achievement of the objectives under the Company's annual cash incentive plans is first determined by senior management and the finance department and then approved by the Compensation Committee of the Board of Directors prior to payment.

Tax Implications

In setting NEO compensation, the Committee takes into account the impact of IRC Section 162(m), which bars the Company from taking a tax deduction for compensation for any NEO that exceeds \$1 million, subject to exceptions for certain performance-based compensation. To the extent that compensation under an annual cash incentive plan and/or in the form of restricted stock units causes the total compensation paid to an NEO to exceed \$1 million in any year, such excess compensation would not be tax deductible to the Company. In the case of cash incentive payments, this is because certain components of the plan, such as the Committee's determination that some operational and individual performance goals have been achieved, may require subjectivity that does not meet the requirements of Section 162(m). In the case of restricted stock unit awards, it is because vesting is based on the length of the NEO's service, which is not performance-based for purposes of Section 162(m).

The Compensation Committee believes that the structure of its cash incentive plans will provide benefits to the Company that outweigh the potential tax deductions that might be available if the plans included only objective performance measures. It also believes that the benefits of the use of service-based restricted stock units to provide long-term incentives outweigh the potential loss of tax deductions from such equity compensation. During 2008, 2009 and 2010, the Company's tax deductions for compensation have not been limited by Section 162(m). The Committee expects to continue to take Section 162(m) into account as it makes decisions in future years and may modify the forms of compensation used accordingly.

In addition, in making compensation decisions, the Committee considers the impact of IRC Section 409A, which imposes certain requirements on "nonqualified deferred compensation plans."

2010 Compensation Committee Report

The Compensation Committee has reviewed and discussed the foregoing Compensation Discussion and Analysis with management and, based on this review and discussion, the Compensation Committee recommended to the Board of Directors that the Compensation Discussion and Analysis be included in this Proxy Statement.

By the Compensation Committee,

H. Brian Thompson, Chairman
R. John Fletcher
Stephen R. Hardis

2010 Summary Compensation Table

Name and Principal Position	Year	Salary (\$)	Stock awards \$(1)	Option awards \$(1)	Non-equity incentive plan compensation \$(2)	All other compensation \$(3)	Total (\$)
Mary G. Puma	2010	\$ 400,001	\$ —	\$ 315,116	\$ 45,000	\$ —	\$ 760,117
<i>Chairman, Chief Executive</i>	2009	\$ 400,000	\$ —	\$ 166,592	\$ —	\$ —	\$ 566,592
<i>Officer and President</i>	2008	\$ 500,000	\$ —	\$ 72,070	\$ —	\$ 6,900	\$ 578,970
Stephen G. Bassett	2010	\$ 300,000	\$ 57,599	\$ 157,558	\$ 45,000	\$ —	\$ 560,158
<i>Executive Vice President</i>	2009	\$ 265,385	\$ —	\$ 83,296	\$ —	\$ —	\$ 348,681
<i>and Chief Financial Officer</i>	2008	\$ 300,000	\$ —	\$ 36,035	\$ —	\$ —	\$ 336,035
Matthew P. Flynn	2010	\$ 350,000	\$ 67,199	\$ 189,070	\$ 45,000	\$ —	\$ 651,268
<i>Executive Vice President,</i>	2009	\$ 309,615	\$ —	\$ 99,955	\$ —	\$ —	\$ 409,570
<i>Customer Operations</i>	2008	\$ 349,999	\$ —	\$ 43,242	\$ —	\$ 6,900	\$ 400,141
Lynnette C. Fallon	2010	\$ 305,001	\$ 73,200	\$ 157,558	\$ 45,000	\$ —	\$ 580,759
<i>Executive Vice President,</i>	2009	\$ 269,808	\$ —	\$ 83,296	\$ —	\$ —	\$ 353,104
<i>HR/Legal and General Counsel</i>	2008	\$ 305,000	\$ —	\$ 36,035	\$ —	\$ 6,900	\$ 347,935
Kevin J. Brewer	2010	\$ 300,000	\$ 46,684	\$ 189,070	\$ 45,000	\$ 725	\$ 581,479
<i>Executive Vice President,</i>	2009	\$ 265,385	\$ —	\$ 83,296	\$ —	\$ 945	\$ 349,626
<i>Operations</i>	2008	\$ 277,885	\$ —	\$ 36,035	\$ —	\$ 7,975	\$ 321,895

- (1) Represents the grant date fair value of the stock and option awards received by the NEO in the year indicated, determined in accordance with FASB ASC Topic 718, using the assumptions described in the Stock Award Plans and Stock-Based Compensation Note to the Company's Financial Statements included in the Form 10-K filed with the Securities and Exchange Commission for the respective year.
- (2) Non-equity incentive plan compensation payments in 2010 represent amounts that were paid under the 2010 Axcelis Management Incentive plan, as described in the "Compensation Discussion and Analysis" above.
- (3) The amounts in this column represent (A) the amount paid in cash as a matching contribution to Axcelis' 401(k) plan in respect of contributions made by the NEO during 2008 and (B) amounts reimbursed under the Company's Executive Tax and Financial Planning Reimbursement Program. In the case of Mr. Brewer, the 2009 figure includes the value of a service award.

Other than Ms. Puma, the named executive officers (NEOs) do not have employment agreements. Ms. Puma's employment agreement is described under the heading "Payments on Termination or Change in Control" in this Proxy Statement. In the case of Ms. Puma, her 2010 and 2009 base compensation reflects her agreement to reduce her base pay by 20% from the amount specified in her employment agreement. In the case of the other NEOs, the 2009 base compensation amounts reflect the eight weeks of unpaid leave required during 2009.

See the "2010 Compensation Discussion and Analysis" for additional information on the 2010 Axcelis Management Incentive Plan and the 2008 Axcelis Team Incentive Plan. Amounts paid under the 2008 Axcelis Team Incentive Plan to the NEOs (other than Ms. Puma, who declined any payment) are disclosed in the "Stock Awards" column above. The Company did not adopt a non-equity incentive compensation plan in 2009.

The proportion that an NEO's salary and non-equity incentive compensation bear to each other and to the NEO's total compensation is largely a result of the various factors involved in the calculation of the payout under the Company's cash incentive plans as described in the "2010 Compensation Discussion and Analysis" above.

Grants of Plan Based Awards in Fiscal 2010

<u>Name</u>	<u>Grant Date</u>	<u>Date of Compensation Committee Approval</u>	<u>Estimated Future Payouts Under Non-Equity Incentive Plan Awards(1)</u>		<u>All Other Stock Awards: Number of Shares of Stock or Units (#)(2)</u>	<u>All Other Option Awards: Number of Securities Underlying Options (#)(3)</u>	<u>Exercise or Base Price of Option Awards (\$/Sh)</u>	<u>Grant Date Fair Value of Stock and Option Awards(4)</u>
			<u>Target (\$)</u>	<u>Maximum (\$)</u>				
Mary G. Puma	7/15/2010	2/11/2010 6/8/2010	\$ 30,000	\$ 60,000		250,000	\$ 1.60	\$ 315,116
Stephen G. Bassett	2/16/2010 7/15/2010	2/11/2010 6/8/2010	\$ 30,000	\$ 60,000	33,488	125,000	\$ 1.60	\$ 57,599 \$ 157,558
Matthew P. Flynn	2/16/2010 7/15/2010	2/11/2010 6/8/2010	\$ 30,000	\$ 60,000	39,069	150,000	\$ 1.60	\$ 67,199 \$ 189,070
Lynnette C. Fallon	2/16/2010 7/15/2010	2/11/2010 6/8/2010	\$ 30,000	\$ 60,000	42,558	125,000	\$ 1.60	\$ 73,200 \$ 157,558
Kevin J. Brewer	2/16/2010 7/15/2010	2/11/2010 6/8/2010	\$ 30,000	\$ 60,000	27,142	150,000	\$ 1.60	\$ 46,684 \$ 189,070

- (1) These target and maximum payouts are under the 2010 Axcelis Management Incentive Plan adopted by the Compensation Committee on February 11, 2010.
- (2) The NEOs, other than Ms. Puma, received restricted stock units under the Company's 2000 Stock Plan for the number of units equaling the NEO's payout under the 2008 Axcelis Team Incentive Plan, in lieu of a cash payment. These restricted stock units vested in full on November 12, 2010. Other than future services to the Company, no consideration was paid or will be due in respect of these restricted stock units or the shares issued thereon. As discussed above, Ms. Puma declined any payout under the 2008 Axcelis Team Incentive Plan.
- (3) The NEOs were granted stock options granted under the Company's 2000 Stock Plan effective July 15, 2010, as described in the table entitled Outstanding Equity Awards at Fiscal 2010 Year End. Other than future services to the Company, no consideration was paid or will be due in respect of these stock options or the shares issued thereon. These stock options will be forfeited if the NEO's employment terminates prior to vesting.
- (4) Represents the grant date fair value of the equity awards received by the NEO in 2010, determined in accordance with FASB ASC Topic 718, using the assumptions described in the Stock Award Plans and Stock-Based Compensation Note to the Company's Financial Statements included in the Form 10-K filed with the Securities and Exchange Commission for 2010.

Outstanding Equity Awards at Fiscal 2010 Year End

Name	Option Awards				Stock Awards	
	Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable	Option Exercise Price (\$)	Option Expiration Date	Number of Shares or Units of Stock that Have Not Vested (#)	Market Value of Shares or Units of Stock that Have Not Vested (\$)(6)
Mary G. Puma						
	1				26,840	\$ 92,866.40
		100,000	0 \$	10.28		
		100,000	0 \$	5.85		
		125,000	0 \$	5.70		
		125,000	0 \$	11.48		
		100,000	0 \$	11.87		
		100,000	0 \$	7.97		
	2	125,000	125,000 \$	0.70		
	3	62,500	187,500 \$	1.16		
	4	0	250,000 \$	1.60		
Stephen G. Bassett						
	1				14,816	\$ 51,263.36
		20,000	0 \$	9.90		
		25,000	0 \$	11.87		
		25,000	0 \$	7.97		
	5	62,500	62,500 \$	0.70		
	3	31,250	93,750 \$	1.16		
	4	0	125,000 \$	1.60		
Matthew P. Flynn						
	1				16,909	\$ 58,505.14
		4,911	0 \$	14.10		
		4,910	0 \$	13.20		
		5,000	0 \$	10.28		
		15,500	0 \$	6.88		
		3,750	0 \$	5.85		
		11,250	0 \$	5.70		
		15,000	0 \$	11.48		
		15,000	0 \$	11.87		
		15,000	0 \$	7.97		
	5	75,000	75,000 \$	0.70		
	3	22,500	112,500 \$	1.16		
	4	0	150,000 \$	1.60		
Lynnette C. Fallon						
	1				16,373	\$ 56,650.58
		27,000	0 \$	11.75		
		13,500	0 \$	14.10		
		13,500	0 \$	13.20		
		30,000	0 \$	10.28		
		30,000	0 \$	5.85		
		30,000	0 \$	5.70		
		30,000	0 \$	11.48		
		30,000	0 \$	11.87		
		30,000	0 \$	7.97		
	5	62,500	62,500 \$	0.70		
	3	31,250	93,750 \$	1.16		
	4	0	125,000 \$	1.60		

Name	Option Awards				Stock Awards	
	Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable	Option Exercise Price (\$)	Option Expiration Date	Number of Shares or Units of Stock that Have Not Vested (#)	Market Value of Shares or Units of Stock that Have Not Vested (\$)(6)
Kevin J. Brewer	1				13,421	\$ 46,436.66
		10,715	0	\$ 14.10	7/30/2011	
		10,714	0	\$ 13.20	7/30/2011	
		7,143	0	\$ 10.28	6/21/2012	
		15,000	0	\$ 6.88	11/5/2012	
		7,143	0	\$ 5.85	6/21/2012	
		10,000	0	\$ 5.70	5/1/2013	
		10,000	0	\$ 11.48	5/1/2013	
		15,000	0	\$ 11.87	6/25/2014	
		15,000	0	\$ 7.97	6/25/2014	
	5	62,500	62,500	\$ 0.70	11/17/2018	
	3	31,250	93,750	\$ 1.16	11/16/2019	
	4	0	150,000	\$ 1.60	7/15/2020	

- (1) These restricted stock units vest on July 1, 2011.
- (2) The unexercisable options will become exercisable as to $\frac{1}{2}$ of the unexercisable shares on each of November 17, 2011 and 2012, provided that no such option shall be exercisable until the closing price of the Company's common stock as reported by the Nasdaq has remained above \$5.00 per share (as adjusted for any stock splits, stock dividends, stock combinations or other similar change in capitalization) for a period of not less than 20 consecutive trading days, provided further that the forgoing proviso will be deemed satisfied in the event that a change of control as defined in the 2000 Stock Plan has occurred on or before the date of exercise.
- (3) The unexercisable options will become exercisable as to $\frac{1}{3}$ of such shares on each of November 16, 2011, 2012 and 2013.
- (4) The unexercisable options will become exercisable as to 25% of such shares on each of July 15, 2011, 2012, 2013 and 2014.
- (5) The unexercisable options will become exercisable as to $\frac{1}{2}$ of the unexercisable such shares on each of November 17, 2011 and 2012, provided that no such option shall be exercisable until the closing price of the Company's common stock as reported by the Nasdaq has remained above \$4.00 per share (as adjusted for any stock splits, stock dividends, stock combinations or other similar change in capitalization) for a period of not less than 20 consecutive trading days, provided further that the forgoing proviso will be deemed satisfied in the event that a change of control as defined in the 2000 Stock Plan has occurred on or before the date of exercise.
- (6) Using the closing market price on December 31, 2010 of \$3.46.

Option Exercises and Stock Vested During Fiscal 2010

Name	Option Awards		Stock Awards	
	Number of Shares Acquired on Exercise (#)	Value Realized on Exercise (\$)	Number of Shares Acquired on Vesting #(1)	Value Realized on Vesting \$(2)
Mary G. Puma	0	0	68,507	\$ 101,843
Stephen G. Bassett	0	0	71,303	\$ 146,299
Matthew P. Flynn	15,000	\$ 29,250.00	78,894	\$ 164,521
Lynnette C. Fallon	0	0	84,347	\$ 176,605
Kevin J. Brewer	0	0	61,396	\$ 123,934

- (1) Represents shares vested during 2010 on restricted stock units granted in 2006, 2007 and 2010. A portion of these vested shares were withheld, and not issued, by the Company for the purposes of tax withholding.
- (2) This represents the total for all of the NEO's vesting dates during 2010 of the products of (A) the number of shares vested on a 2010 vesting date multiplied by (B) the closing market price on the vesting date or, if the shares vest on a day which is not a trading day, the first trading day after the vesting date. The actual amount received by the executives on the sale of the net shares issued on restricted stock units will depend on the market values at the time of such transactions.

Payments on Termination or Change of Control

Employment Agreement with Ms. Puma. The Company has an Employment Agreement with Ms. Puma effective November 2007 that provides for a one-year term of employment at a minimum annual base salary of \$500,000 and an annual target incentive compensation opportunity of 100% of base salary. In 2009, Ms. Puma agreed to modifications to her employment agreement affecting her compensation for 2008, 2009 and 2010. She agreed to reduce her base compensation for 2009 and 2010 to \$400,000. She also declined any incentive compensation for 2008 or 2009. The modification agreement specified that the reduced pay during these periods would not impact separation payments that might become due under her Employment Agreement or her Change of Control Agreement.

Ms. Puma's base salary and incentive opportunities may be subject to future adjustment by the Board, but not below the minimum levels in her Employment Agreement, unless mutually agreed. The term of Ms. Puma's agreement automatically renews on a year-to-year basis unless one party notifies the other that the agreement will not be extended. Such termination notice must be sent within a 60 day window period beginning 180 days prior to the next anniversary of the effective date. The agreement also provides that Ms. Puma will participate in the 2000 Stock Plan, the 401(k) savings plan and the welfare benefit plans that we sponsor.

In the event Ms. Puma's employment is terminated prior to the end of the term for reasons other than cause, death, disability or voluntary resignation without "good reason," she is entitled to receive all compensation accrued to date, acceleration of vesting of options and other equity rights and a cash separation payment. The cash separation payment will equal 24 months of her base compensation and two times an annual bonus amount determined in accordance with the agreement. For this purpose, Ms. Puma's annual bonus compensation will be her current base multiplied by the greater of (a) the percentage of her base that she actually received as a bonus for the prior fiscal year or (b) 25%. The

following table sets forth the separation pay that would have been due to Ms. Puma if a qualifying termination occurred on December 31, 2010:

<u>Lump sum cash payment(1)</u>	<u>Value of accelerated vesting on equity awards(2)</u>	<u>18 months of COBRA premiums for health coverage(3)</u>	<u>Total</u>
\$1,250,000	\$1,679,111	\$26,507	\$2,955,618

- (1) This amount represents 24 months of Ms. Puma's base salary at the highest rate in effect in the year preceding December 31, 2010 without giving effect to her 2009 compensation modification agreement (\$41,667) plus 24 months of a minimum bonus amount specified in the agreement equal to 25% of the base pay (\$10,417). This amount is due within 30 days of termination.
- (2) This amount reflects a valuation of the acceleration of Ms. Puma's outstanding equity awards using the methodology prescribed under IRC Section 280G, which provides for an excise tax on certain change of control payments. This valuation is based on the closing price of our common stock on the last trading day of 2010 (\$3.46). The actual amount received by Ms. Puma on exercise of options and sales of shares issued on restricted stock units will depend on the market values at the time of such transactions.
- (3) Ms. Puma's employment agreement provides that the Company will pay for up to 18 months of COBRA premiums. This amount represents 18 months of COBRA premiums in effect during 2010 for Ms. Puma's coverage elections. Actual COBRA rates will change on January 1, 2011.

In the event of an actual termination of Ms. Puma's employment, it is possible that her separation pay would be renegotiated by Ms. Puma and the Board of Directors, in which case the amounts payable might differ from the foregoing.

Change of Control Agreements. The Company has entered into a Change of Control Agreement with each of our executive officers, including Ms. Puma, to provide that severance compensation will be paid in a lump sum within 30 days of a covered termination following a change in control, as defined in the agreement. These Change of Control Agreements provide that executive officers are entitled to severance compensation in the event there is both (1) a change in control and (2) a termination of employment within three years of that change in control for reasons other than cause, death, disability or voluntary resignation without Good Reason. Under the Change of Control Agreements, "Good Reason" can be a material diminution in the executive's authority, a material reduction in base pay or a material change in geographic location of the executive's job. A "change of control" is defined in the agreement and covers a number of events, including a merger or acquisition involving the Company in which the persons holding the Company's shares immediately prior to the transaction hold less than 75% of the shares outstanding after the transaction.

In these agreements, the executives have agreed not to be engaged by, or own, any business competing with any of the businesses conducted by the Company for a period of 12 months following any termination of employment (whether or not following a change of control). The executives also agreed not to solicit employees of the Company to leave employment with the Company or solicit or induce customers of the Company to cease doing business with the Company, during such period.

If severance compensation is payable, it would consist of a cash payment equal to the sum of (a) the Company's accrued obligations for base pay and incentive compensation and (b) the amount determined by multiplying the executive's then salary and average bonus by three. For this purpose, an executive's average bonus is his or her current bonus opportunity multiplied by the average of the individual performance scores given to the executive in the last three years, but without taking into

account company performance scores. In the event such severance is payable, all unvested restricted stock units and options held by the executive will become vested until termination or expiration in accordance with their terms. We will also reimburse the executive for the effects, including federal, state and local income tax consequences, of any excise tax due on severance compensation, as shown the chart below. The excise taxes due under Sections 280G and 4999 of the IRC are unpredictable and can have widely divergent and unexpected effects based on an executive's personal compensation history. Therefore, to provide a predictable and equal level of benefit between individuals without regard to the effect of the excise tax, the Company determined that it was appropriate to pay the cost of this excise tax plus an amount needed to pay income taxes due on such additional payment. The amounts due to each named executive officer in the event that a change of control and termination occurred on December 31, 2010 are set forth in the table below:

Estimated Payments under the Change of Control Agreements if due at December 31, 2010

<u>Name</u>	<u>Lump sum cash payment(1)</u>	<u>Value of accelerated vesting on equity awards(2)</u>	<u>Excise tax due under IRC 280G, plus gross-up amount(3)</u>	<u>Total</u>
Mary G. Puma	\$ 1,628,400	\$ 1,679,111	\$ 859,184	\$ 4,166,695
Stephen G. Bassett	\$ 617,400	\$ 844,384	\$ —	\$ 1,461,784
Matthew P. Flynn	\$ 1,182,000	\$ 1,010,253	\$ 654,174	\$ 2,846,427
Lynnette C. Fallon	\$ 1,042,500	\$ 849,770	\$ 544,348	\$ 2,436,618
Kevin J. Brewer	\$ 1,024,500	\$ 886,056	\$ 569,202	\$ 2,479,758

- (1) This amount, which is due within 30 days of termination, represents (A) separation pay equal to three times (1.78 times in the case of Mr. Bassett) the NEO's current base salary plus an average bonus amount based on past performance assessments and (B) the amount earned but unpaid under the 2010 Axcelis Management Incentive Plan at target.
- (2) This amount reflects a valuation of the acceleration of the NEO's outstanding equity awards using the methodology prescribed under IRC Section 280G, which provides for an excise tax on certain change of control payments. This valuation is based on the closing price of our common stock on the last trading day of 2010 (\$3.46). The actual amount received by the NEO on exercise of options and sales of shares issued on restricted stock units will depend on the market values at the time of the change of control.
- (3) The Change of Control Agreement with each NEO provides for the Company's reimbursement of the excise tax liability due on the separation pay under I.R.C. Section 280G, which amount is grossed up to cover income taxes due on such reimbursement. Therefore, the amounts shown in this column represent amounts due to taxing authorities and will not be retained by the executive.

In the event Ms. Puma receives payment under her Change of Control Agreement, she will not receive amounts and benefits due under her Employment Agreement unless such amounts are in excess of the amounts paid under the Change of Control Agreement. Also, in the event of an actual termination of an NEO's employment in connection with a change of control, it is possible that the NEO's separation pay would be renegotiated by the NEO and the Board of Directors, in which case the amounts payable might differ from the foregoing.

COMPENSATION OF DIRECTORS

The Nominating and Governance Committee has responsibility under its charter to review and determine recommended non-employee director compensation for adoption by the full Board. All equity grants to non-employee directors are either made under automatic granting language in the 2000 Stock Plan or by the Compensation Committee on the recommendation of the Board of Directors.

2010 Director Fees. Annual cash compensation for our non-employee directors, which has not changed since 2007, is as follows:

Retainers (paid in quarterly installments)	
Lead Director	\$50,000
Board Member (not Lead Director)	\$30,000
Audit Committee Chair	\$15,000
Compensation Committee Chair	\$10,000
Nominating Committee Chair	\$7,500
Meeting Fees (paid quarterly following meetings)	
In Person Board Meetings	\$2,000 per meeting
Telephone Board Meetings	\$1,000 per meeting
In Person or Telephone Committee Meetings	\$1,000 per meeting, only to committee members

Non-employee directors also receive reimbursement of out-of-pocket expenses incurred in attending Board and committee meetings. Non-employee directors do not receive any Company-paid perquisites.

2010 Equity Awards. All non-employee directors of Axcelis receive an automatic initial stock option grant for 40,000 shares under our 2000 Stock Plan upon initial election to the Board. These non-employee director options have an exercise price equal to the closing price of our common stock on the grant date and are fully exercisable on the 181st day after the date the option is granted, provided the optionee is still a director on that date. The options have a term of ten years from the date of grant. No new non-employee directors joined the Board in 2010.

On May 7, 2010, the Compensation Committee approved the issuance under the 2000 Stock Plan of non-qualified stock options exercisable for 50,000 shares of common stock to each of the non-employee directors, effective July 15, 2010. These option grants became fully exercisable on the 181st day after the date of grant as each director remained in service on that date. Long term ownership of equity awards by directors is encouraged through the Company's director stock ownership guidelines in effect during 2010, which provide that non-employee directors should own a minimum of 20,000 shares of Axcelis common stock. This level was set to create meaningful investments by directors in shares of the Company, so that their interest in the value of the Company's stock was not limited to stock price appreciation via options without a downside.

The chart below shows compensation for all non-employee directors who served the Company during 2010:

<u>Name</u>	<u>Fees earned or paid in cash (\$)</u>	<u>Stock awards (\$)(1)</u>	<u>Option awards (\$)(2)(3)</u>	<u>Total (\$)</u>
R. John Fletcher	\$ 53,000	\$ —	\$ 63,023	\$ 116,023
Stephen R. Hardis	\$ 69,000	\$ —	\$ 63,023	\$ 132,023
William C. Jennings	\$ 62,000	\$ —	\$ 63,023	\$ 125,023
Patrick H. Nettles	\$ 50,500	\$ —	\$ 63,023	\$ 113,523
H. Brian Thompson	\$ 55,000	\$ —	\$ 63,023	\$ 118,023
Geoffrey Wild	\$ 47,000	\$ —	\$ 63,023	\$ 110,023

- (1) The outside directors did not receive any restricted stock grants in 2010.
- (2) The amount shown represents the grant date fair value of the option awards received by the director in 2010, determined in accordance with FASB ASC Topic 718, using the assumptions described in the Stock Award Plans and Stock-Based Compensation Note to the Company's Financial Statements included in the Form 10-K filed with the Securities and Exchange Commission for 2010.
- (3) As of December 31, 2010, the non-employee directors in office held the following total stock options, all of which were fully vested (except the 2010 grants discussed above) and had exercise prices ranging from \$0.44 to \$14.17:

	<u>Aggregate # of shares subject to outstanding options</u>	<u>Lowest exercise price</u>	<u>Highest exercise price</u>
Fletcher	155,000	\$ 0.44	\$ 11.91
Hardis	176,000	\$ 0.44	\$ 14.17
Jennings	155,000	\$ 0.44	\$ 11.91
Nettles	185,000	\$ 0.44	\$ 14.17
Thompson	185,000	\$ 0.44	\$ 13.22
Wild	140,000	\$ 0.44	\$ 6.61

CORPORATE GOVERNANCE

Board of Directors Leadership Structure and Risk Oversight

Our Governance Policies provide that, if the Chairman of the Board is the Chief Executive Officer, the independent directors shall elect a Lead Director. The Board believes that having a Lead Director allows the Chief Executive Officer to focus principally on managing the Company, enhances Board administration and communications between the independent directors, and allows for consistent Board leadership during any Chief Executive Officer transition. Accordingly, when Mary G. Puma became Chairman of the Board of Directors in May 2006 in addition to her role as Chief Executive Officer, Stephen R. Hardis was appointed by the Board as Lead Director. The responsibilities of the Lead Director include:

- Setting the board's agenda in collaboration with the CEO;
- Acting as a regular communication channel between the board and CEO;
- Organizing and presiding over executive sessions to review the company's performance and management effectiveness;
- Conducting exit interviews with resigning senior managers to determine whether their departure reflect problems with the CEO or other company issues;

- Coordinating the activities of the independent directors;
- With the Chairman of the Nominating and Governance Committee, addressing any actions arising from the annual Board self-evaluation, coordinating the assessment of the committee structure, organization, and charters, and evaluating the need for any changes; and
- Coordinating the performance evaluation of the Chairman and CEO.

The Board designates the Lead Director annually after each annual meeting of shareholders. Our Board has determined that this leadership structure is appropriate for our business because the title of Chairman is commonly recognized by our customers as being the top management position. Giving Ms. Puma that title ensures that she is recognized by all third parties as our most senior manager. In practice, the role of the Lead Director as described above and in our Governance Policies encompasses all of the management oversight and Board leadership functions typically held by a non-executive Chairman. The Company provides an appropriately substantial retainer to compensate the outside director assuming the Lead Director role for the director's time, effort and focus.

Axcelis' business involves many unavoidable operational and financial risks which management and our Board seek to mitigate through careful planning and execution. Our risks include:

- The highly competitive nature of the semiconductor equipment industry, which may limit the rate and level of acceptance of our current products by customers;
- We may be unable to continually invest in product improvement and new product development to meet customer expectations for both technological and cost factors;
- We may be unable to maintain an adequate a global infrastructure to support our customers;
- The cyclical nature of the semiconductor industry and its overall condition in a particular period;
- We may be unable to access sufficient capital to meet fluctuating capital requirements; and
- The uncertainties of global economies, including the availability of credit.

Our Board of Directors provides oversight for these operational risks by receiving reports from management at our quarterly in-person Board meetings, as well as through monthly management reports and interim telephonic meetings. These include reports on the market environment, customer sales results and forecasts, product development results and forecasts, and overall financial performance and forecasts. Board members have the opportunity to provide input and direction to management on managing our risks in the context of the current information. In order to ensure that longer term risks are also considered by the Board in a timely and consistent matter, the full Board dedicates one in-person meeting each year to review and approve a strategic plan and to review and approve a profit plan. These plans are used to manage the business throughout the year. In addition, one Board meeting each year is focused on longer term technology development to ensure the emerging market trends are identified, understood and their implications for Axcelis' products appropriately addressed.

Board of Directors Independence and Meetings

The Board of Directors has determined that all directors who served on the Board during 2010, other than Ms. Puma, are or were independent under the criteria established by NASDAQ, and that the members of the Audit Committee also meet the additional independence requirements of the Securities and Exchange Commission. None of the directors, to the Company's knowledge, had any business, financial, family or other type of relationship with the Company or its management (other than as a director and stockholder of the Company), except for any relationships that the Board considered to be immaterial under the NASDAQ independence standards. In determining that each such director is independent, the Board considers whether Axcelis purchases and sells products and services from and to companies (or their affiliates) at which directors are or have been employed as

officers or serve as directors. During 2010, Mr. Hardis served as a director of an entity that sold products or services to the Company. The amount paid to the other entity by the Company was below the total revenue threshold in the NASDAQ independence standards (that is, the greater of \$200,000 or 5% of the recipient's consolidated gross annual revenues). The Board has determined that this relationship did not impair Mr. Hardis' independence.

Our Board of Directors held five meetings during 2010. The average rate of attendance at Board and committee meetings for all current directors was 96% and the lowest rate of attendance for any one director was 86%. All Board members whose terms continue after the annual meeting of stockholders are expected to attend the annual meeting of stockholders, subject to special circumstances. All Board members then in office attended the annual meeting in 2010. Our Board has standing Audit, Compensation and Nominating and Governance Committees. Independent directors have regularly scheduled executive sessions at which only independent directors are present.

Compensation Committee

During 2010, the Compensation Committee was composed of Mr. Thompson (Chairman), Mr. Hardis and Mr. Fletcher. The Compensation Committee holds four regularly scheduled meetings per year and occasionally calls special meetings or acts by written consent to address particular matters. In 2010, the Compensation Committee met six times. The Compensation Committee operates under a written charter, a copy of which is available on our website at www.axcelis.com.

The Compensation Committee establishes the compensation philosophy for Axcelis and has all the authority of the Board of Directors to act or exercise corporate powers with respect to the compensation of the executive officers and the administration of Axcelis' equity compensation plans. The Compensation Committee is responsible to ensure that an annual review of executive officer performance and succession planning is presented to the Board.

The Compensation Committee meets in the first quarter of each year to establish the goals and targets applicable to the executives' annual incentive compensation for the coming year, as well as to determine the results for the year just ended. In 2010, annual equity compensation decisions for executive officers were made on June 8, 2010 with the grants effective on July 15, 2010. Other compensation decisions are made throughout the year, as circumstances warrant and as described in detail in the "2010 Compensation Discussion and Analysis" above. The Committee may delegate its authority under the 2000 Stock Plan to the extent permitted by applicable law, including delegating to executive officers the authority to make awards other than to directors or executive officers.

To support its decision-making processes, the Compensation Committee accesses the advice of an independent compensation consultant with respect to the structure and competitiveness of the Company's executive compensation programs, as well as the programs' consistency with the Company's executive compensation philosophy. The Committee has the sole authority to hire and fire all outside compensation consultants providing information and advice to the Committee. During 2010, the Compensation Committee's compensation consultant was Pearl Meyer & Partners, which firm did not provide any other services to the Company, other than providing some consulting services to the Nominating and Governance Committee. At the request of the Committee, management will make specific proposals to the Committee regarding compensation for executive officers. Management will often work with the Committee's outside consultant to ensure that the consultant has access to the appropriate information to enable the consultant to complete its analyses for the Committee. Management ensures that the consultant's invoices are paid from Company funds. The Chief Executive Officer, the Chief Financial Officer and the Executive VP HR/Legal usually participate in Compensation Committee meetings to present and discuss the material. After such a discussion, Mr. Bassett and Ms. Fallon will leave the meeting, allowing the Compensation Committee time to meet alone with Ms. Puma, after which she leaves the Committee in executive session. All decisions on

executive compensation are made by the Compensation Committee in executive session without Ms. Puma.

For a discussion on the Compensation Committee's actions during 2010, see the "Compensation Discussion and Analysis" above.

Nominating and Governance Committee

During 2010, the Nominating and Governance Committee was composed of Mr. Nettles (Chairman) and Mr. Hardis. The Nominating and Governance Committee is responsible for identifying and nominating candidates for membership on the Board of Directors, making recommendations to the Board on non-employee director compensation and establishing governance policies for the Board and management. The Committee operates under a written charter and governance policies, copies of which are available on our website at www.axcelis.com. The Committee held four meetings in 2010. The Committee has the sole authority to hire and fire all outside consultants providing information and advice to the Committee. During 2010, the Nominating and Governance Committee utilized Pearl Meyer & Partners (which firm also provides consulting services to the Compensation Committee) to provide advice on director and executive stock ownership guidelines and on director compensation.

Under a process established by the Nominating and Governance Committee, the Board of Directors undertakes an annual self-evaluation of Board size, function and management interaction. In addition, each Board member completes an annual self and peer performance review.

The Nominating and Governance Committee seeks new nominees for election to the Board, when necessary, through a variety of channels, including the engagement of director search firms and less formal recommendations through business and personal contacts. Director search firms engaged by the Company are paid a retainer fee to identify and screen candidates meeting specifications established by the Committee for a particular Board nominee search. Such specifications will change from one search to another based on the Committee's determination of the needs of Board composition at the time a particular search is initiated.

The Nominating and Governance Committee will evaluate any candidate recommended for nomination as a director, whether proposed by a stockholder or identified through the Committee's own search processes, about whom it is provided appropriate information. In evaluating a candidate, the Committee must, at a minimum, determine that the candidate is capable of discharging his or her fiduciary duties to the stockholders of the Company. The Committee will determine whether the particular nomination would be consistent with Axcelis' governance policies. These policies provide in part that all new candidates for election to the Board and all Board members eligible for nomination for re-election to the Board shall be evaluated on the following criteria:

- (a) such candidate or Board member's current level of, and on-going commitment to, education regarding the responsibilities of a member of a Board of Directors under standards established by the Nominating and Governance Committee;
- (b) the adequacy of such candidate or Board member's time available to commit to responsibilities as a member of the Board;
- (c) the existence of any financial relationship with the Company other than that arising as an employee of the Company, as a Board member and/or as a stockholder; and
- (d) in the case of re-election, such member's compliance with our Director Stock Ownership Guidelines.

If a candidate is presented to the Nominating and Governance Committee at a time when it has established specifications for a particular Board search, the Committee will consider whether the candidate satisfies the established specifications. More generally, the Committee will consider a

candidate's skills, character, leadership experience, business experience and judgment, and familiarity with relevant industry, national and international issues in light of the backgrounds, skills and characteristics of the current Board and the needs of the Company's business. The Nominating and Governance Committee will consider a nominee's national origin or ethnicity if it contributes to Board diversity that is beneficial to the Company for business reasons. Given the portion of the Company's revenues derived from Asian customers, Board members with insight into Asian business or markets are highly valued. Finally, the Committee must consider whether a nominee (in conjunction with the existing Board members) will assist the Company in meeting the requirements of applicable law, the rules of the Securities and Exchange Commission, the NASDAQ listing standards, and the Internal Revenue Code regarding the independence, sophistication and skills of the members of the Board of Directors and the Audit, Compensation and Nominating and Governance committees.

In order to recommend a candidate for consideration by the Nominating and Governance Committee, a stockholder must provide the Committee with the candidate's name, background and relationship with the proposing stockholder, a brief statement outlining the reasons the candidate would be an effective director of Axcelis and information relevant to the considerations described above. Such information should be sent to the Nominating and Governance Committee of Axcelis Technologies, Inc., 108 Cherry Hill Drive, Beverly, Massachusetts 01915, Attn: Corporate Secretary. The Committee may require further information.

Audit Committee

The Audit Committee operates under a written charter and is responsible for assisting the Board of Directors in monitoring and oversight of (1) the integrity of the Company's financial statements and its systems of internal accounting and financial controls and (2) the independence and performance of the Company's internal and independent auditors. The Audit Committee has adopted procedures for the handling of complaints regarding accounting, internal controls and auditing matters which are described in our Code of Ethics. The Audit Committee's charter and the Company's Code of Ethics are both available on our website at www.axcelis.com. The Audit Committee met nine times during 2010. The Audit Committee consisted of Mr. Jennings (Chairman), and Messrs. Fletcher and Wild.

The Board of Directors has determined that each of Mr. Jennings, Mr. Fletcher and Mr. Wild are audit committee financial experts as defined by the Securities and Exchange Commission. The Board's conclusions regarding the qualifications of a director as an audit committee financial expert are based on his certification that he has (1) an understanding of generally accepted accounting principles and financial statements; (2) the ability to assess the general application of such principles in connection with the accounting for estimates, accruals and reserves; (3) experience preparing, auditing, analyzing or evaluating financial statements that present a breadth and level of complexity of accounting issues that are generally comparable to the breadth and complexity of issues that can reasonably be expected to be raised by the Company's financial statements, or experience actively supervising one or more persons engaged in such activities; (4) an understanding of internal controls and procedures for financial reporting; and (5) an understanding of audit committee functions.

For a report on the Audit Committee's actions during 2010, see the "2010 Audit Committee Report" below.

2010 Audit Committee Report

The Audit Committee schedules meetings to occur after the preparation of quarterly and annual financial statements but prior to the public release of financial results for the period. The Committee met in April, July and November of 2010, prior to the release of the financial results for the first, second and third quarters of 2010, respectively, and in January 2011, prior to the release of our 2010 year-end results. If appropriate, additional meetings may also be held during the year to address a variety of recurring and non-recurring topics, such as the Company's internal control systems, changes to the Audit Committee charter and other matters.

At all of these meetings, Axcelis' Chief Executive Officer and Chief Financial Officer were present, as were our General Counsel and our independent auditors. The Committee's agenda is established by the Committee's chairman, with input from the Company's Chief Financial Officer. Depending on the content of the meeting, the Committee holds private sessions with the Company's independent auditors, and, separately, with management, at which candid discussions of financial management, accounting and internal control issues can take place. In its executive sessions with representatives of the independent auditors, the Committee seeks to engage in a meaningful dialogue to address any questions or concerns identified by the Committee and to obtain an understanding of any questions or concerns of the auditors.

At the recommendation of the Audit Committee, the Board of Directors appointed Ernst & Young LLP as our Independent Registered Public Accounting Firm to audit our financial statements for 2010. At the 2010 annual meeting of stockholders, our stockholders ratified this appointment. The Audit Committee discussed with our independent auditors and the Company's Chief Financial Officer overall audit scopes and plans, the results of external audit examinations, evaluations by the auditors of the Company's internal controls and the quality of the Company's financial reporting.

Management has reviewed with the Audit Committee the audited consolidated financial statements for the year ended December 31, 2010 prepared by management and audited by Ernst & Young LLP, management's assessment of the effectiveness of our internal control over financial reporting and Ernst & Young LLP's evaluation of our internal control over financial reporting. In addition, the Committee received from the independent auditors their annual written reports covering matters required to be discussed by the auditors with the Committee under the Public Company Accounting Oversight Board's New Ethics and Independence Rule 3526, *Communication with Audit Committees Concerning Independence*. These items were discussed with the auditors and management at an Audit Committee meeting, including a discussion of any relationship that may impact the objectivity and independence of our auditors and whether the provision of any non-audit services by the auditors is compatible with maintaining their independence. The review included a discussion of the quality, not just the acceptability, of the accounting principles, the reasonableness of significant judgments, and the clarity of disclosures in the financial statements.

In reliance on these reviews and discussions, and the report of our Independent Registered Public Accounting Firm, the Audit Committee recommended to the Board of Directors that such audited financial statements be included in the Company's 2010 Annual Report on Form 10-K for filing with the Securities and Exchange Commission and in the Annual Report to Stockholders which accompanies this proxy statement.

The Committee and the Board have also recommended, subject to reconsideration in the absence of stockholder ratification, the selection of the Company's independent auditors for the current year, as discussed above under "Proposal 2: Ratification of the Appointment of Our Independent Registered Public Accounting Firm."

In performing all of these functions, the Audit Committee acts only in an oversight capacity. Necessarily, in its oversight role, the Committee relies on the work and assurances of the Company's management, which has the primary responsibility for financial statements and reports, and of the independent auditors, who in their report on the audited annual financial statements, express an opinion on the conformity of the Company's annual financial statements to accounting principles generally accepted in the United States.

By the Audit Committee,

William C. Jennings, Chairman
R. John Fletcher
Geoffrey Wild

Code of Ethics

Axcelis has set forth its policy on ethical behavior in a document called "Ethical Business Conduct at Axcelis." This policy applies to the members of our Board of Directors and all employees, including (but not limited to) our principal executive officer, principal financial officer, principal accounting officer or controller and persons performing similar functions. This policy comprises written standards that are reasonably designed to deter wrongdoing and to promote the behavior described in Item 406 of Regulation S-K promulgated by the Securities and Exchange Commission. The text of this code of ethics is posted on the Investors page of our website at www.axcelis.com, where we may also disclose any amendments to and waivers of the code.

Certain Relationships and Related Transactions

The governance rules of NASDAQ require the Company to conduct an appropriate review of all related party transactions which are disclosable under Item 404 of Regulation S-K. In its charter, the Nominating and Governance Committee is given responsibility to review and approve any such related party transactions, including (a) business arrangements between the Company and directors or their affiliates or between the Company and employees, other than compensation for service as a director or as an employee of the Company, and (b) any other relationships between a director or employee and the Company or a third party (including membership on the boards of directors of a third party) which create the appearance or reality of a current or potential conflict of interest.

Axcelis reviews all relationships and transactions reported to it in which the Company and our directors and executive officers or their immediate family members are participants to determine whether such persons have a direct or indirect material interest. The Company's General Counsel is primarily responsible for the development and implementation of processes and controls to obtain information from the directors and executive officers with respect to related person transactions and for then determining, based on the facts and circumstances, whether the Company or a related person has a direct or indirect material interest in the transaction. As required under SEC rules, transactions that are determined to be directly or indirectly material to the Company or a related person are disclosed in the Company's proxy statement. In addition, the Nominating and Governance Committee reviews and approves or ratifies any related person transaction that is required to be disclosed. In the course of its review and approval or ratification of a disclosable related party transaction, the Nominating and Governance Committee considers:

- the nature of the related person's interest in the transaction;
- the material terms of the transaction, including, without limitation, the amount and type of transaction;
- the importance of the transaction to the related person;
- the importance of the transaction to the Company;
- whether the transaction would impair the judgment of a director or executive officer to act in the best interest of the Company; and
- any other matters the Committee deems appropriate.

Any member of the Nominating and Governance Committee who is a related person with respect to a transaction under review may not participate in the deliberations or vote respecting approval or ratification of the transaction, provided, however, that such director may be counted in determining the presence of a quorum at a meeting of the Committee that considers the transaction.

During 2010, no related person transactions requiring disclosure in the proxy statement were identified or submitted to the Nominating and Governance Committee for approval. As discussed

above under "Board of Directors Independence and Meetings," the Company had arms-length commercial dealings with a company of which Mr. Hardis is a director, which are not material individually or in the aggregate.

OTHER MATTERS

Stockholder Communications to the Directors

Security holders may communicate with the Axcelis Board of Directors by mailing a communication to the entire Board or to one or more individual directors in care of the Corporate Secretary, Axcelis Technologies, Inc., 108 Cherry Hill Drive, Beverly, Massachusetts 01915. All communications from security holders to Board members (other than communications soliciting the purchase of products and services) will be promptly relayed to the Board members to whom the communication is addressed.

Compensation Committee Interlocks and Insider Participation

During 2010, the Compensation Committee of the Board of Directors consisted of Mr. Hardis, Mr. Fletcher and Mr. Thompson, as Chairman, none of who has been an officer or employee of Axcelis or had a relationship during 2010 requiring disclosure under Item 404 of Regulation S-K.

Section 16(a) Beneficial Ownership Reporting Compliance

Section 16(a) of the Exchange Act requires our directors, executive officers and persons owning more than 10% of our registered equity securities to file with the SEC reports of their initial ownership and of changes in their ownership of our common stock and to provide us with copies of all Section 16(a) reports they file.

To our knowledge, based solely on our review of copies of reports furnished to us and written representations that no other reports were required, during 2010, our directors, officers, and 10% stockholders complied with all Section 16(a) filing requirements, except for a Form 4 reflecting a purchase transaction due on behalf of William C. Jennings on August 17, 2010 and filed on August 27, 2010.

Deadlines for Stockholder Proposals

Assuming the 2012 annual meeting is not held more than 30 days before or 30 days after April 26, 2012, if you wish to bring business before or propose director nominations at the 2011 annual meeting, you must give written notice to Axcelis by January 27, 2012 (the date 90 days before the anniversary of the 2011 annual meeting).

If you intend to bring proposed business to the 2012 annual meeting and you would like us to consider the inclusion of your proposal in our proxy statement for the meeting, you must provide written notice to Axcelis of such proposal prior to November 26, 2011 (120 days before the anniversary date of the mailing of this proxy statement), assuming the 2012 annual meeting is not held more than 30 days before or 30 days after April 26, 2012.

Notices of stockholder proposals and nominations shall be given in writing to Axcelis Technologies, Inc., 108 Cherry Hill Drive, Beverly, Massachusetts 01915, Attn: Corporate Secretary.

2011 Annual Meeting Admission Ticket

2011 Annual Meeting of
Axcelis Technologies, Inc. Stockholders

Tuesday, April 26, 2011, 10:30 am EST
108 Cherry Hill Drive
Beverly, MA 01915

Upon arrival, please present this admission ticket
and photo identification at the registration desk.

Directions to Axcelis Technologies, Inc. headquarters at 108 Cherry Hill Drive, Beverly, MA

From Boston's Logan Airport: On leaving Boston's Logan Airport, take Route 1A north for 3 miles. Turn left onto Route 60 West for 2 miles. At the 2nd rotary, take Route 1 North for 6.6 miles. Exit onto Routes 95/128 North toward Gloucester.

From Route 128 North: Take Route 128 North to Exit 22 W. At bottom of exit ramp, take a right onto Route 62. Take your first right onto State Road, bear right at fork onto Conant Street. Follow Conant Street past the Cherry Hill Creamery on left and take a left onto Cherry Hill Drive. 108 Cherry Hill Drive is the first building on your right.

▼ IF YOU HAVE NOT VOTED VIA THE INTERNET OR TELEPHONE, FOLD ALONG THE PERFORATION, DETACH AND RETURN THE BOTTOM PORTION IN THE ENCLOSED ENVELOPE. ▼



Proxy — Axcelis Technologies, Inc.

Notice of 2011 Annual Meeting of Stockholders

108 Cherry Hill Drive, Beverly, MA 01915

Proxy Solicited by Board of Directors for Annual Meeting — Tuesday, April 26, 2011

Mary G. Puma, Jay Zager, Lynnette C. Fallon, or any of them, each with the power of substitution, are hereby authorized to represent and vote the shares of the undersigned, with all the powers which the undersigned would possess if personally present, at the Annual Meeting of Stockholders of Axcelis Technologies, Inc. to be held on April 26, 2011 or at any postponement or adjournment thereof.

Shares represented by this proxy will be voted by the stockholder. If no such directions are indicated, the Proxies will have authority to vote FOR all nominees, FOR Proposals 2 and 3 and every YEAR for Proposal 4.

In their discretion, the Proxies are authorized to vote upon such other business as may properly come before the meeting.

(Items to be voted appear on reverse side.)