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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 Pursuant to §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:

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NOTICE OF ANNUAL MEETING OF STOCKHOLDERS
To Be Held May 12, 2005

The 2005 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 11:00 a.m. on Thursday, May 12, 2005 for the following purposes:

1. To elect three (3) directors to serve until the 2008 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, 2005.
3. 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 21, 2005 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, which appears to read "Lynnette Fallon", is written over a horizontal line.

Lynnette C. Fallon
Secretary

Dated: April 4, 2005

PROXY STATEMENT

The Board of Directors of Axcelis Technologies, Inc. ("Axcelis" or the "Company") is soliciting your proxy for use at the 2005 annual meeting of stockholders to be held on Thursday, May 12, 2005 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 April 4, 2005.

General Information About Voting

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 21, 2005. On that date, there were 100,184,413 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 your shares either by proxy or by attending the meeting and voting in person. If you choose to vote by proxy, please complete, date, sign and return the proxy card in the enclosed postage prepaid envelope. 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 of the proposals contained in this proxy statement, 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 reelection of three directors whose current terms end in 2005 and the ratification of the selection of independent auditors of the Company.

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:

Proposal	Required Vote
• Election of three 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 the year ending December 31, 2005	This requires the affirmative vote of a majority of the votes cast.

Abstentions. Abstaining from voting for a nominee in the election of directors or on the proposal to ratify the appointment of our auditors 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 both the election of directors and ratification of auditors.

Discretionary voting by proxies on other matters. Aside from the proposals for the election of directors and the ratification of our selection of auditors, we do not know of any other proposals that

may be presented at the 2005 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, 2004 by persons known by us to own more than 5% of our common stock.

Beneficial Owner(1)	Shares Owned	Percent of Class
FMR Corp., Edward C. Johnson 3rd and Abigail P. Johnson(2) 82 Devonshire Street, Boston, MA 02109	12,994,717	13.0%
Mellon Financial Corporation, Mellon Trust of New England, National Association, The Boston Company, Asset Management, LLC(3) One Mellon Center, Pittsburgh, Pennsylvania 15258	11,470,139	11.47%
Sterling Capital Management LLC, Sterling MGT, Inc., Eduardo A. Brea, Alexander W. McAlister, David M. Ralston, Brian R. Walton, and Mark Whalen(4) 4064 Colony Road, Charlotte, NC 28211	6,100,732	6.2%
Ziff Asset Management, L.P., PBK Holdings, Inc., Philip B. Korsant(5) 283 Greenwich Avenue, Greenwich CT 06830	5,123,948	5.13%

- (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, 2004.
- (2) Based on a Schedule 13G/A filed by the holders with the Securities and Exchange Commission in February 2005, which states that such shares are owned by investment companies and institutional accounts managed by subsidiaries of FMR Corp., including Fidelity Management and Research Company, which is the beneficial owner of 10,722,327 of such shares (10.7% of the class). According to the Schedule 13G/A, FMR Corp. and, by virtue of their controlling interests in FMR Corp., Mr. Johnson and Ms. Johnson have sole voting power over, and the sole power to dispose of, all of such shares.
- (3) Based on a Schedule 13G/A filed by Mellon Financial Corporation ("Mellon") with the Securities and Exchange Commission in February 2005, which states that Mellon has sole voting power with respect to 10,320,356 shares and sole dispositive power with respect to 11,414,036 shares and shared dispositive power with respect to 353 shares. Such shares are held by various subsidiaries of Mellon, including Mellon Trust of New England, National Association (8,121,978 shares; 8.1%) and The Boston Company, Asset Management, LLC (6,944,218 shares; 6.9%). Mellon indicated that the total shares include shares issuable on conversion of Convertible Notes of the Company.
- (4) Based on a Schedule 13G/A filed by the holders with the Securities and Exchange Commission in January 2005, which states that such shares are owned by investment advisory clients of Sterling Capital Management LLC ("Sterling"). According to the Schedule 13G/A, Sterling, Sterling MGT, Inc. and Eduardo A. Brea, Alexander W. McAlister, David M. Ralston, Brian R. Walton and Mark Whalen, the controlling persons of Sterling and Sterling MGT, Inc., all have shared voting and investment power over such shares.
- (5) Based on a Schedule 13G filed by the holders with the Securities and Exchange Commission in February 2005, which states that the three holders shares the power to vote and dispose of all of such shares.

SHARE OWNERSHIP OF DIRECTORS AND EXECUTIVE OFFICERS

The following table shows the amount of our common stock beneficially owned as of March 1, 2005 by our directors, the executive officers named in the Summary Compensation Table on page 18 below, and all of our current executive officers and directors as a group.

Beneficial Owner(1)	Shares Owned	Options or Warrants Exercisable as of April 29, 2005	Total Shares Beneficially Owned	Percent of Class
Non-Executive Directors				
Alexander M. Cutler(2)	28,178	100,000	128,178	*
R. John Fletcher	7,000	55,000	62,000	*
Stephen R. Hardis	70,735	100,000	170,735	*
William C. Jennings	5,000	55,000	60,000	*
Patrick H. Nettles	11,500	85,000	96,500	*
H. Brian Thompson	5,000	85,000	90,000	*
Gary L. Tooker(3)	17,537	100,000	117,537	*
Named Executive Officers				
Mary G. Puma(4)	72,763	990,413	1,063,176	1.1%
Michael J. Luttati	15,338	639,603	654,941	*
Stephen G. Bassett	7,500	20,000	27,500	*
David W. Duff(5)	12,460	92,426	104,886	*
Lynnette C. Fallon	7,033	92,250	99,283	*
All current Executive Officers and Directors as a Group (15 persons)(6)				
	260,939	2,550,819	2,811,758	2.8%

* Indicates less than 1%.

- (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 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, 2005 (60 days after March 1, 2005) 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, 2005, plus any shares these persons could acquire upon the exercise of any options held by them on or before April 29, 2005.
- (2) Mr. Cutler's ownership includes an aggregate of 1,178 shares owned by his wife as trustee for Mr. Cutler's two minor children.
- (3) Mr. Tooker's ownership includes 17,537 shares owned by a trust for which Mr. Tooker has shared voting and investment power.
- (4) Ms. Puma's ownership includes 10,000 shares owned by her husband.
- (5) Mr. Duff's ownership includes 5,742 shares that are subject to forfeiture to the Company. This forfeiture provision will end as to 1,914 shares on each of July 30, 2005, 2006 and 2007 (assuming Mr. Duff is employed on those dates), at which time such shares shall be fully vested.
- (6) Includes shares and exercisable options held by the directors and named executive officers, as well as three other executive officers who hold an aggregate of 895.5 shares and 136,127 exercisable options.

PROPOSAL 1: ELECTION OF DIRECTORS

Our Board of Directors has fixed the number of directors at eight, which number is subject to increase by action of the Board. Under our charter, our Board is divided into three classes as nearly equal in number of directors as possible. The term of one class expires, and their successors are elected for a term of three years, at each annual stockholders' meeting. At the upcoming annual meeting, three directors will be elected to hold office for a term of three years until our annual meeting in 2008 and until their successors are elected and qualified. Each of the Board's nominees, H. Brian Thompson, Stephen R. Hardis and R. John Fletcher, 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 three nominees.

The following table contains biographical information about the nominees for director and current directors whose term of office will continue after the meeting. In March 2005, Gary L. Tooker informed the Board of Directors that he would resign his seat on the Board effective at the 2005 annual meeting of shareholders.

Name and Age	Business Experience and Other Directorships	Director Since	Present Term Expires
*R. John Fletcher Age: 59	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 fund. Prior to founding Fletcher Spaght, Inc., Mr. Fletcher was a manager at the Boston Consulting Group. Mr. Fletcher is also a director of AutoImmune, Inc., Spectranetics Corporation and V.I. Technologies, Inc.	2003	2005
*Stephen R. Hardis Age: 69	Mr. Hardis is the Company's Chairman of the Board. He was Chairman and Chief Executive Officer of Eaton Corporation, 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 American Greetings Corporation, Lexmark International Group, Inc., Marsh & McLennan Companies, Inc., Nordson Corporation, Progressive Corporation, and Steris Corporation.	2000	2005

*H. Brian Thompson Age: 65	Mr. Thompson is the Chairman of Comsat International, a privately held independent telecommunications company operating throughout Latin America, a position he assumed in January 2003. He has also been the Chief Executive Officer of Universal Telecommunications, Inc., a private investment and advisory firm, since 1991. Since January 2005, Mr. Thompson also serves as the Chairman and Chief Executive Officer of Mercator Partners Acquisition Corporation, a blank check company formed for the purpose of effecting a merger, capital stock exchange, asset acquisition or other similar business combination with an unidentified operating business. Mr. Thompson previously served as Chairman and Chief Executive Officer of Global Telesystems, Inc., a telecommunications company, from March 1999 through September 2000 and served as Chairman and Chief Executive Officer of LCI International, a telecommunications company, from July 1991 until its sale to Qwest Communications International, Inc., a broadband internet communications company, in June 1998. At that time, Mr. Thompson became Vice Chairman of the Board of Qwest until his resignation in December 1998. Earlier, he was Executive Vice President of MCI Communications through its growth years in the 1980s. Mr. Thompson serves on the Boards of Directors of Bell Canada International, Inc., Comsat International, ArrayComm, Inc, United Auto Group, Sonus Networks, Inc. and Mercator Partners Acquisition Corporation.	2002	2005
Patrick H. Nettles Age: 61	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	2007
Alexander M. Cutler Age: 53	Mr. Cutler is Chairman and Chief Executive Officer of Eaton Corporation, a global diversified industrial manufacturer. Prior to assuming this position in August 2000, Mr. Cutler was President and Chief Operating Officer of Eaton Corporation since 1995. Mr. Cutler served as Eaton's Executive Vice President and Chief Operating Officer—Controls from 1993 to 1995, as its Executive Vice President—Operations from 1991 and President of its Industrial Group from 1986. He is also a director of KeyCorp.	2000	2007

Mary G. Puma Age: 47	Ms. Puma has been the Company's Chief Executive Officer and President since January 2002 and President and Chief Operating Officer since May 2000. Prior to that, she served as General Manager and Vice President of the Semiconductor Equipment Operations of Eaton Corporation. 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 a director of Nordson Corporation.	2000	2006
William C. Jennings Age: 65	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 provides independent consulting services to a number of companies. He is also a director of Silgan Holdings Inc. and Nyfix, Inc.	2003	2006

* Indicates a nominee for election as director.

Board of Directors Independence and Meetings

The Board of Directors has determined that all directors, other than Ms. Puma, are independent under Nasdaq Rule 4200(a)(15). Independent directors have regularly scheduled meetings at which only independent directors are present.

Our Board of Directors held 5 meetings during 2004. Each of our incumbent directors attended at least 75% of the meetings of the Board and of the committees on which such director served. The average rate of attendance for all current directors was 99%. 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 eight current Board members attended the annual meeting in 2004.

Committees of the Board of Directors

Our Board has standing Audit, Compensation and Nominating and Governance Committees.

Audit Committee. The Audit Committee 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 available on our website at www.axcelis.com. The Audit Committee operates under a written charter, a copy of which is available on our website at www.axcelis.com. The Audit Committee

met 8 times during 2004. Until April 2004, the Audit Committee consisted of Mr. Cutler (Chairman), Mr. Nettles, Mr. Thompson, and Mr. Jennings. Since then, the Audit Committee has consisted of Mr. Jennings (Chairman), Mr. Thompson and Mr. Fletcher.

In addition to the independence determination discussed above, the Board of Directors has determined that Mr. Jennings is an audit committee financial expert as defined in Item 401 of Regulation S-K promulgated by the Securities and Exchange Commission. The Board's conclusions regarding the qualifications of Mr. Jennings as an audit committee financial expert were based on his degrees in accounting and finance, certifications in accounting and service as a chief financial officer and as an audit partner and internal controls practice partner at a national accounting firm.

For a report on the Audit Committee's actions during 2004, see the "Audit Committee Report" below.

Compensation Committee. 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 operates under a written charter, a copy of which is also available on our website at www.axcelis.com. The Compensation Committee is composed of Mr. Thompson, as Chairman, and Messrs. Hardis, Tooker and Cutler. The Compensation Committee held 4 meetings in 2004.

For a report on the Compensation Committee's actions during 2004, see the "Compensation Committee Report on Executive Compensation" below.

Nominating and Governance Committee. The Nominating and Governance Committee of the Board of Directors 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. Its members are Mr. Nettles, chairman, and Messrs. Hardis and Cutler. 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 2 meetings in 2004.

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 Policy.

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. Finally, the Committee must consider whether a nominee (in conjunction with the existing Board members) will assist the Company in meeting the requirements of the Sarbanes Oxley Act of 2002, 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.

Director Compensation

Director Fees. Mr. Hardis, the Chairman of the Board, receives an annual retainer of \$200,000, payable quarterly. Each director (other than Mr. Hardis and Ms. Puma) receives an annual retainer of \$20,000 payable quarterly. In addition, each director (other than Mr. Hardis or Ms. Puma) assuming responsibility as Chairman of a committee of the Board of Directors receives an annual retainer of \$7,500. Non-employee directors other than Mr. Hardis also receive cash fees for attendance at Board and committee meetings. The meeting fees are: (1) \$2,000 for attendance in person at a meeting of the Board of Directors; (2) \$1,000 for attendance at a meeting of any committee of the Board of Directors; and (3) \$1,000 for participation in a telephonic meeting of the Board of Directors or committee of the Board of Directors. Fees are paid only to committee members with respect to attendance at a committee meeting. 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.

Automatic Option Grants. All non-employee directors of Axcelis receive automatic initial and annual stock option grants under our 2000 Stock Plan. The initial option grant is for 40,000 shares and is granted upon initial election to the Board. Non-employee directors receive automatic annual grants for 15,000 shares beginning in the first calendar year after such director's first election to the Board. Annual grants are issued at the first meeting of the Board of Directors on or after July 1 of each year. All 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.

AUDIT COMMITTEE REPORT

The Audit Committee 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 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 October of 2004, prior to the release of the financial results for the first, second and third quarters of 2004, respectively and in January 2004 prior to the release of our 2003 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, the scope and results of the Company's internal audit plans, changes to the Audit Committee charter and other matters. In addition, throughout 2004, the Audit Committee provided oversight of the Company's preparations for management's assessment of its internal controls over financial reporting as required by Section 404 of the Sarbanes Oxley Act of 2002. The Committee receives regular reports from management on this topic and confirmation of the processes and timing of preparation from the independent auditors. During 2004, the Audit Committee held a total of eight (8) meetings.

At all of these meetings, Axcelis' Chief Executive Officer, Chief Operating Officer and Chief Financial Officer were present, as was 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, the Company's internal 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 2004. At the 2004 annual meeting of stockholders, our shareholders 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. In addition, during 2004, Ernst & Young LLP communicated to the Audit Committee certain relationships between Ernst & Young and its related entities and the Company and its related entities that, in the judgment of Ernst & Young LLP, may reasonably be thought to bear on Ernst & Young's independence. In each case, Ernst & Young LLP concluded that the disclosed matters did not impair Ernst & Young's independence from the Company. Following each such disclosure, the Audit Committee considered the matter and also concluded that it did not impair Ernst & Young's independence.

Management has reviewed with the Audit Committee the audited 2004 consolidated financial statements for the year ended December 31, 2004 prepared by management and audited by Ernst & Young LLP. In addition, the Committee received from the independent auditors (1) their annual written reports covering matters required to be discussed by the auditors with the Committee under Statement on Auditing Standards No. 61, *Communication with Audit Committees* and (2) their disclosures and the letter regarding independence from the Company and its management, which disclosures and letter are made under Independence Standards Board Standard No. 1, *Independence Discussions with Audit Committees*. Both 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 the 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 2004 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 below 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
H. Brian Thompson
R. John Fletcher

EXECUTIVE COMPENSATION

Compensation Committee Report on Executive Compensation

The Compensation Committee establishes and reviews 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. This report is submitted by the Compensation Committee and addresses the compensation policies for 2004 as they affected Ms. Puma, as Chief Executive Officer, and the other current executive officers.

Compensation Philosophy

The Company's executive compensation program is designed with the objective of attracting and retaining executives and motivating management to meet and exceed the Company's annual and long-term performance goals.

In general, the Company seeks to provide base salaries, target bonus compensation and equity compensation within the 50th percentile of such categories of compensation paid by similar companies for comparable positions, based on market benchmarking data compiled by external consulting firms. In determining the total amount and mix of the compensation package for each executive officer, the Committee members subjectively consider the unique education, training and experience of the executive officer, his or her overall value to the Company in light of numerous factors such as contributions to the Company's competitive position in the marketplace, individual performance, and the past and expected contribution by the executive officer toward the achievement of the Company's performance objectives. In reaching these decisions, the 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.

The Company strives to provide compensation opportunities that emphasize effectively rewarding management for the achievement of critical performance objectives. The Committee supports a pay-for-performance policy that determines compensation amounts based on Company and individual performance. While the establishment of base salaries turns principally on the factors noted above, incentive bonuses for senior corporate executives are based on the performance of the Company as a whole, and can be increased or decreased to reflect individual performance. In addition, the program provides stock incentive opportunities designed to align the interests of executives and other key employees with other stockholders through the ownership of Common Stock. The following is a discussion of each of the elements of the Company's executive compensation program including a description of the decisions and actions taken by the Committee with respect to compensation in the year ended December 31, 2004 for the Chief Executive Officer and all executive officers as a group.

Executive Compensation Program

The Company's executive compensation program consists of base salary, an annual cash bonus opportunity and stock option awards and/or restricted stock grants. Executives may also participate in a financial and tax planning benefit available to executives, described below and other benefit plans available to all employees.

Base Salary. The Committee's primary objective is to set base salaries of executive officers at a level that reflects the median salary salaries for similar positions at comparable companies in the Company's industry. Although the Committee reviews each executive officer's base salary annually, the Committee does not routinely adjust base salary to reflect annual performance. Adjustments in executive officer base salary are generally made from time to time to reflect changes in the median base salary benchmarked for the officer's position or changes in the executive's role or levels of

responsibility. The Committee relies principally on the incentive bonus program and option grants to drive pay-for-performance, thereby avoiding wage inflation from cumulative annual base increases.

Incentive Bonus Program. Since our separation from Eaton Corporation in 2000, the Compensation Committee has implemented a single annual bonus plan, called the Axcelis Team Incentive Plan, in which all employees participate. An executive officer's payout under the Axcelis Team Incentive Plan depends on three factors:

- (1) a Company Performance Score determined by the Compensation Committee in light of the achievement of specific financial or non-financial goals that are set by the Compensation Committee at the beginning of each year;
- (2) the officer's target bonus as set by the Compensation Committee at the beginning of the year and reviewed annually, which is expressed as a percentage of the officer's actual base earnings for the year; and
- (3) the officer's individual performance score which is determined by the Compensation Committee at the time of bonus payout to reflect the officer's individual performance during the course of the plan year.

After completion of the plan year, the Committee determines the Company Performance Score, which may range from 0% to 200%, based on goal achievement. A 100% Company Performance Score results in each executive having the opportunity to receive his or her target bonus, subject to adjustment for the individual performance score, which can range from 0% to 150%. The Company Performance Score was 0% in each of 2001 and 2002 (due to financial performance in those years), resulting in no bonus payout. In 2003, the Committee approved a 20% Company Performance Score, resulting in below target payouts under the 2003 Axcelis Team Incentive Plan.

In February 2004, the Committee approved a design for the 2004 Axcelis Team Incentive in which the Company Performance Score was based 60% on financial goals and 40% on non-financial operational goals. The financial goals were based on the Company's profit plan for 2004, and included specific targets for 2004 revenues, gross margin, pre-tax profit and cash generation. The operational goals were derived from the Company's 2004 strategic plan and included multiple detailed targets in the areas of product improvement and customer relationships. In its meetings throughout 2004, the Committee monitored the Company's performance against the Axcelis Team Incentive goals. In January 2005, the Committee determined that the Company's performance against the 2004 financial goals scored at 152%. The Committee considered factors relating to the quality of the financial results as well as the actual quantitative results. The Committee also determined that the Company's performance against the non-financial operational goals drove an 80% score. These scores, once weighted, resulted in an aggregate Company Performance Score of 123%.

For 2004, the target opportunities under the Axcelis Team Incentive Plan for each of the executive officers were fixed by the Compensation Committee at percentages of base compensation ranging from 40% to 100%, in the case of Ms. Puma. In setting these target opportunities, the Committee seeks to set a target that is consistent with the median short term cash incentive compensation targets set for similar positions at comparable companies in the Company's industry. The Committee reviews each executive officer's target incentive opportunity annually and adjustments may be made to reflect changes in the benchmarking data or changes in the executive's role or levels of responsibility.

To determine each officer's payout, the Compensation Committee must set an individual performance score, ranging from 0% to 150%. The Committee makes this assessment based on the executive's achievement of his or her personal and team goals set at the beginning of the year, taking into account the Chief Executive Officer's recommendation (for the other executive officers) and the business results in the executive's area of responsibility. The amounts paid to our Chief Executive Officer and the four other most highly paid executive officers under the 2004 Axcelis Team Incentive are set forth in the Summary Compensation table in this proxy statement.

Long Term Incentives. The Committee believes it is in the best interests of the Company and its stockholders to grant stock options as a long-term component of executive and key employee compensation program. Stock option grants to executive officers and other key employees are intended to keep employee financial interests in line with long-term stockholder value.

Stock option grants are consistent with the Committee's pay-for-performance objective, in that compensation will only result if the stock price appreciates from the date of grant. In general, option grants to executives are made upon hire and/or promotion and thereafter on an annual basis. All option grants under our 2000 Stock Plan have an exercise price equal to the closing price of the Company's common stock on the date of grant. Stock options granted to the Company's executive officers and other employees of the Company typically including a four year vesting provision, in which 25% of the shares vest on each of the first four anniversaries of the date of grant. In general, options issued by the Company expire on the 10th anniversary of the date of grant. The Committee believes that rationing the exercisability of these stock options over future years helps retain key executives. In addition, option grants constructively influence management's motivation to enhance the value of the Company's stock.

The Company maintains a single equity compensation plan, the 2000 Stock Plan (approved by stockholders in May 2002), which permits the issuance of stock options and restricted stock and other equity compensation. As of December 31, 2004, 33,173,367 shares of common stock had been reserved for issuance under the 2000 Stock Plan, 656,800 of which have been issued (on exercise of options and as restricted stock) and 15,317,621 of which are subject to outstanding options. Grants under the 2000 Stock Plan in 2004 were 2,157,275 shares, representing 2.157% of the Company's shares outstanding. The Committee annually reviews the number of shares available for issuance under the 2000 Stock Plan and makes a recommendation to the Board of Directors regarding the evergreen feature of the plan, which permits an increase in the number of shares available for issuance under the 2000 Stock Plan on each July 14th during the term of the plan. The increase is set at a number of shares equal to the lesser of (i) five (5%) percent of the then number of outstanding shares of Common Stock of the Company, (ii) 5,000,000 shares or (iii) such lesser amount determined by the Board. In 2004, on recommendation of the Compensation Committee, the Board of Directors determined that no increase would be made to the shares reserved under the 2000 Stock Plan in respect of this provision on July 14, 2004. The 2000 Stock Plan will expire on May 1, 2012.

As set forth in the Option Grants in Last Fiscal Year table in this proxy statement, in 2004 the executive officers received annual option grants, half of which were priced in June 2004 and half in December 2004. The Committee's practice of using two pricing dates for annual option grants, 6 months apart, is designed to reduce the arbitrariness of selecting a single pricing day each year, in light of the high volatility of the trading prices of Axcelis stock. The number of shares subject to the option grants for each executive was determined based on market practices for similar companies, the executive's performance and the executive's existing option portfolio.

Other Benefits and Perquisites. Executives also participate in benefit plans available to all employees, including an Internal Revenue Code Section 401(k) plan, under which the Company made a matching contribution to each participant in 2004, and the Employee Stock Purchase Plan, an Internal Revenue Code Section 423 plan through which employees may elect to purchase Axcelis shares through salary deductions. Other than a tax and financial planning reimbursement program capped at \$5,500 per year, Axcelis offers no material executive perquisites.

Chief Executive Officer Compensation Actions during 2004

Ms. Puma's minimum base compensation is set by her Employment Agreement. See "Executive Agreements" below. In June 2004, the Committee adjusted Ms. Puma's base compensation to \$500,000 to ensure market competitiveness. In adjusting Ms. Puma's compensation, the Committee referred to

the level of median base compensation paid to chief executive officers of Ms. Puma's experience in companies of similar size in comparable businesses, as reflected in market benchmarking data.

Ms. Puma participated in the 2004 Axcelis Team Incentive annual bonus plan described in detail above. The Compensation Committee set her individual target bonus at 100% of her base compensation in light of median total cash compensation being paid to chief executive officers of Ms. Puma's experience in companies of similar size in comparable businesses. The Compensation Committee fixed Ms. Puma's individual performance score at 113% in light of her performance during 2004. In reaching this decision, the Committee considered (1) that revenue in 2004 was the second highest in the history of the Company, (2) pre-tax profit and cash generation exceeded the profit plan targets for the year, (3) the Company maintained its leadership in ion implant and strengthened its position in dry strip with product penetrations at major semiconductor manufacturers worldwide, (4) the first orders were received for the Company's new single wafer ion implant platform and new products in low-k curing and cleaning and (5) Ms. Puma's leadership and management skills. Therefore, the payout for Ms. Puma under the 2004 Axcelis Team Incentive plan was the result of a 123% Company Performance Score, multiplied by 100% of her actual base earnings in 2004, multiplied by a 113% individual performance score, for a total of \$675,000, as set forth in the Summary Compensation Table.

Ms. Puma received stock option grants totaling 200,000 shares, priced in two equal tranches, in June and December 2004, at market. These option grants will vest 25% per year on each of June of 2005, 2006, 2007 and 2008. Ms. Puma will only realize compensation on these options if the Axcelis stock price appreciates from the exercise price, and if so, we believe that the grant should have significant retention effect on Ms. Puma through June 2008. It was determined by the Committee that this additional annual option grant supported both shareholder alignment and continued retention.

As with the other executives, the number of shares subject to the option grant to Ms. Puma was determined based on market practices for similar companies, her performance and her existing option portfolio. In making this grant, the Committee also considered Ms. Puma's leadership and management skills, her extensive knowledge base and contacts derived from her long tenure with the Company, the need to retain Ms. Puma's services to continue on-going business initiatives, and the disruption and the costs that would be incurred if the Company was not successful in retaining Ms. Puma.

Compensation Deductibility

Section 162(m) of the Internal Revenue Code denies a tax deduction to a public corporation for annual compensation in excess of one million dollars paid to its Chief Executive Officer and its four other highest compensated officers. Certain types of "performance based compensation" (including options granted under the 2000 Stock Plan), are exempt from the limitation on deductibility. Because of the subjectivity of the non-financial components of the Company Performance Score and the individual performance score, Ms. Puma's 2004 Axcelis Team Incentive bonus does not qualify for this exemption, so a portion of that bonus will not be deductible. We believe that the structure of the Axcelis Team Incentive Plan provides benefits to the Company that outweigh the potential tax deductions that might be available if the Plan included only objective performance measures. In general, we will continue to award compensation that is not fully deductible under the Internal Revenue Code if such an award is consistent with our compensation policies and, in our judgment, is in the best interests of the company and its stockholders.

By the Compensation Committee,

H. Brian Thompson, Chairman
Stephen R. Hardis
Alexander M. Cutler
Gary L. Tooker

Compensation Tables

The following tables contain information on compensation paid for the years ended December 31, 2002, 2003 and 2004 to our Chief Executive Officer and the four other most highly paid executive officers as of the end of 2004.

Summary Compensation Table

Name and Position	Year	Annual Compensation			Long Term Compensation Awards	
		Salary (\$)	Bonus (\$)	Other Annual Compensation (\$)(1)	Securities Underlying Options	All Other Compensation(2)
Mary G. Puma <i>President and Chief Executive Officer</i>	2004	\$ 486,250	\$ 675,000	\$ 5,500	200,000	\$ 6,150
	2003	\$ 450,000	\$ 90,000	\$ 4,005	250,000	\$ 67,203(3)
	2002	\$ 415,002	0	\$ 3,500	200,000	\$ 67,729(4)
Michael J. Luttati <i>Executive Vice President and Chief Operating Officer</i>	2004	\$ 383,653	\$ 350,381	\$ 3,900	120,000	\$ 6,150
	2003	\$ 350,000	\$ 42,000	\$ 5,378	100,000	\$ 6,000
	2002	\$ 293,868	0	\$ 1,167	100,000	\$ 1,000
Lynnette C. Fallon <i>Senior Vice President HR/Legal, General Counsel</i>	2004	\$ 304,616	\$ 186,870	0	60,000	\$ 6,150
	2003	\$ 295,000	\$ 23,600	0	60,000	\$ 6,000
	2002	\$ 295,000	0	0	73,500	\$ 1,000
Stephen G. Bassett <i>Senior Vice President and Chief Financial Officer</i>	2004	\$ 275,999	\$ 169,740	0	50,000	0
	2003(5)	\$ 172,500	0	0	20,000	0
David W. Duff <i>Vice President, Product Development</i>	2004	\$ 239,616	\$ 119,365	\$ 349	45,000	\$ 6,150
	2003	\$ 230,000	\$ 19,550	\$ 2,289	40,000	\$ 6,000
	2002	\$ 194,588	0	\$ 436	60,715	\$ 1,000

- (1) Amounts in this column represent payments to, or on behalf of, the executive under the Executive Tax and Financial Planning Program.
- (2) Except as indicated, amounts in this column represent amounts paid in cash as a matching contribution to Axcelis' 401(k) plan in respect of contributions made during the year.
- (3) Represents (a) \$6,000 paid in cash as a matching contribution to Axcelis' 401(k) plan in respect of contributions made during 2003 and (b) \$61,203 in principal and accrued interest forgiven by the Company on December 31, 2003 under a promissory note due from Ms. Puma.
- (4) Represents (a) \$1,000 paid in cash as a matching contribution to Axcelis' 401(k) plan in respect of contributions made during 2002 and (b) \$66,729 in principal and accrued interest forgiven by the Company on December 31, 2002 under a promissory note due from Ms. Puma.
- (5) Mr. Bassett commenced providing services to Axcelis in June 2003.

Option Grants in Last Fiscal Year

The following table provides information on stock options granted under our 2000 Stock Plan during fiscal year 2004 to the executive officers named in the Summary Compensation Table.

Name	Option Grants in Last Fiscal Year					Potential Realizable Value at Assumed Annual Rates of Stock Price Appreciation for Option Term(3)		
	Number of Securities Underlying Options Granted	Percentage of Total Options Granted to Employees in Fiscal Year	Exercise Price per Share	Expiration Date	5%		10%	
Mary G. Puma	100,000(1)	4.6%	\$ 11.87	6/25/2014	\$ 746,498	\$ 1,891,772		
	100,000(2)	4.6%	\$ 7.97	6/25/2014	\$ 501,229	\$ 1,270,213		
Michael J. Luttati	60,000(1)	2.8%	\$ 11.87	6/25/2014	\$ 447,899	\$ 1,135,063		
	60,000(2)	2.8%	\$ 7.97	6/25/2014	\$ 300,737	\$ 762,128		
Lynnette C. Fallon	30,000(1)	1.4%	\$ 11.87	6/25/2014	\$ 223,949	\$ 567,532		
	30,000(2)	1.4%	\$ 7.97	6/25/2014	\$ 150,369	\$ 381,064		
Stephen G. Bassett	25,000(1)	1.2%	\$ 11.87	6/25/2014	\$ 186,624	\$ 472,943		
	25,000(2)	1.2%	\$ 7.97	6/25/2014	\$ 125,307	\$ 317,553		
David W. Duff	22,500(1)	1.0%	\$ 11.87	6/25/2014	\$ 167,962	\$ 425,649		
	22,500(2)	1.0%	\$ 7.97	6/25/2014	\$ 112,777	\$ 285,798		

- (1) These options were granted with an exercise price equal to their market value on the grant date, on June 25, 2004 and become exercisable, subject to continued employment, with respect to 25% of the shares on each of June 25, 2005, 2006, 2007 and 2008.
- (2) These options were granted with an exercise price equal to their market value on the grant date, on December 27, 2004 and become exercisable, subject to continued employment, with respect to 25% of the shares on each of June 25, 2005, 2006, 2007 and 2008.
- (3) The dollar amounts in this column represent hypothetical values of options granted to the named executives during 2004 and outstanding at December 31, 2004. The amounts shown assume the fair market value of the underlying common stock will appreciate from the date of grant at a 5% or 10% compounded rate for the full 10 year term of the option. The assumed 5% and 10% annual compounded rates of stock price appreciation are mandated by the rules of the SEC and do not represent our estimate or projection of future prices of our common stock. Actual gains, if any, on stock option exercises will depend upon the future performance of our common stock's price, which will benefit all stockholders proportionately.

Aggregated Option Exercises in Last Fiscal Year and Fiscal Year-End Option Values

The following table provides information on options exercised during 2004 by the named executive officers and the total number of exercisable and unexercisable stock options held at December 31, 2004 by those officers.

Name	Shares Acquired on Exercise (#)	Value Realized(1)	Number of Securities Underlying Unexercised Options at Fiscal Year-End Exercisable/Unexercisable	Value of Unexercised in-the-Money Options at Fiscal Year-End Exercisable/Unexercisable(2)
Mary G. Puma	0	—	990,413/608,720	\$254,986/\$357,813
Michael J. Luttati	0	—	639,603/245,000	\$87,375/\$157,725
Lynnette C. Fallon	0	—	85,500/148,500	\$52,425/\$93,675
Stephen G. Bassett	0	—	20,000/50,000	\$0/\$4,000
David W. Duff	0	—	79,926/105,358	\$12,150/\$40,050

- (1) Calculated by subtracting the option exercise price from the closing price of the stock on the date of exercise as reported by Nasdaq, then multiplying that number by the number of shares exercised. The amounts in this column may not represent amounts actually realized by the officer.
- (2) Based on the difference between the option's exercise price and the closing price of \$8.13 of the underlying common stock on December 31, 2004, as reported by Nasdaq.

Executive Agreements

Agreements with Ms. Puma. We entered into an Employment Agreement with Ms. Puma effective in July 2000. Her agreement provided for an initial three-year term of employment at a minimum annual base salary of \$380,000 and an annual target incentive compensation opportunity of 45% of base salary. Actual incentive compensation for any year may be greater or less if actual performance is greater or less than the target. Ms. Puma's base salary and incentive opportunities were increased by our Board of Directors in 2003, and may be subject to future adjustment by the Board, but not to less than the minimum levels in her Employment Agreement. See "Compensation Committee Report on Executive Compensation." 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 between January 14th and March 14th of each year. Since no termination notice was sent prior to March 14, 2005, the agreement will continue until July 14, 2006, subject to further renewal. 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, she is entitled to receive all compensation accrued to date, acceleration of vesting of options and other equity rights and base compensation and target bonus for two years from the date of termination of employment. If Ms. Puma were entitled to such separation pay as of the date of this proxy statement, she would be entitled to a cash payment of \$2,350,000 under this agreement. In her agreement, Ms. Puma has agreed not to compete with us for a period of 12 months after termination of her active employment or the remaining term of her agreement, whichever is longer, and not to reveal confidential information for a specified period of time.

In connection with our separation from Eaton Corporation in 2000, Eaton assigned to us a note payable by Ms. Puma in the original principal amount of \$175,000, which bears interest at the rate of 9% per annum. As contemplated by the original terms of the note, principal in the amount of \$58,334

and accrued interest on the note was forgiven on each of December 31, 2001, 2002 and 2003, as shown in the Summary Compensation Table above.

Executive Agreement with Mr. Bassett. In December 2003, we entered into an Executive Officer Agreement with Mr. Bassett. This agreement provided for a minimum annual base salary for Mr. Bassett of \$276,000, and stipulated the effect of Mr. Bassett's termination of employment prior to June 30, 2004. Mr. Bassett continues to be employed by the Company and the agreement expired on June 30, 2004.

Executive Separation Agreement with Dr. van Maaren. On January 28, 2005, the Company entered into an Executive Separation Agreement with Jan Paul van Maaren, Ph.D., pursuant to which Dr. van Maaren resigned from his position as Vice President and General Manager of the Company's Curing and Cleaning product division, on February 11, 2005, but continues as a part-time employee of the Company until December 30, 2005 (the "Separation Date"). The Separation Agreement releases Axcelis from any claims by Dr. van Maaren and supersedes the Change in Control Agreement, dated December 20, 2001, between Dr. van Maaren and Axcelis. The Separation Agreement describes the transition and separation benefits to be provided to Dr. van Maaren. Pursuant to the Separation Agreement, Dr. van Maaren will receive all compensation due to him through the Separation Date including his salary (at the rate of \$215,000 per annum) and a payout of \$52,748 under the Axcelis Team Incentive Plan for 2004. Dr. van Maaren is eligible to participate in substantially all employee benefit plans until the Separation Date.

Change of Control Agreements. We also have entered into Change of Control Agreements with each of our executive officers, including Ms. Puma. These Change of Control Agreements provide that in the event there is both a change in control and a termination of employment within three years of that change in control for reasons other than voluntary resignation, cause, death or disability, the officer would be entitled to severance compensation. Under the Change of Control Agreement, a resignation by an officer for reasons of a demotion or reduction in compensation, benefits or position is a termination by us and is not a voluntary resignation. If severance compensation is payable, it would consist of (i) a cash payment equal to the sum of (a) incentive compensation for the completed portion of the incentive period and (b) the amount determined by multiplying the employee's then salary and average bonus by three, and (ii) continuation of our medical, life and other welfare benefits for up to two years. In the event such severance is payable, all unvested options held by the executive will become exercisable until termination or expiration in accordance with their terms. We will also reimburse the employee for the effects, including federal, state and local income tax consequences, of any excise tax due on severance compensation. In the event that Ms. Puma's employment is terminated following a change of control, she will be entitled to receive the greater of the amounts and benefits under her Employment Agreement described above or her Change of Control Agreement but not the aggregate of the amounts and benefits under both agreements.

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 our internet site at www.axcelis.com, where we may also disclose any amendments to and waivers of the code.

Equity Plan Reserves Disclosure

The Company maintains two equity compensation plans, the 2000 Stock Plan and the Employee Stock Purchase Plan. These plans are summarized in the Report of the Compensation Committee of the Board of Directors appearing above in this proxy statement. The number of shares issuable upon exercise of outstanding options granted to employees and non-employee directors, as well as the number of shares remaining available for future issuance, under the company's equity compensation plans as of December 31, 2004 are summarized in the following table:

Plan category	(A) Number of shares to be issued upon exercise of outstanding options	(B) Weighted-average exercise price of outstanding options	(C) Number of shares remaining available for future issuance under equity compensation plans (excluding shares reflected in column (A))
Equity compensation plans approved by stockholders	15,317,621	\$ 11.91	21,135,463(1)
Equity compensation plans not approved by stockholders	0	NA	0
Total	15,317,621		21,135,463

(1) Represents the total shares available for issuance under our 2000 Stock Plan and our Employee Stock Purchase Plan, as of December 31, 2004, as follows:

(A) 17,198,946 shares were available for future issuance under the 2000 Stock Plan. Such amount represents the total number of shares reserved for issuance under the 2000 Stock Plan, less 152,131 outstanding shares issued under the plan as restricted stock, 504,669 shares issued upon option exercises, and the outstanding options shown in column (A), all as of December 31, 2004. This plan is generally used for grants to employees and directors and was approved by our stockholders at our 2002 annual meeting. The number of shares available for issuance under the 2000 Stock Plan may increase on each July 14th during the term of the plan. The increase is set at the number of shares equal to the lesser of (i) five (5%) percent of the then outstanding shares of Common Stock of the Company, (ii) 5,000,000 shares or (iii) such lesser amount determined by the Board. The Board of Directors elected not to increase the number of shares reserved under this plan in 2004.

(B) 3,936,517 shares were available under the Company's Employee Stock Purchase Plan, which represents the total number of shares reserved for issuance under the plan less 2,507,197 shares issued through December 31, 2004. As of December 31, 2004, the reserve had been increased to 6,443,714. The Employee Stock Purchase Plan was approved by Eaton Corporation, as our sole stockholder prior to our initial public offering, in compliance with Internal Revenue Code Section 423. The number of shares available for issuance under the Employee Stock Purchase Plan increases by the number of shares equal to 1% of the outstanding common stock on each December 31st, up to a maximum of 7,500,000 shares.

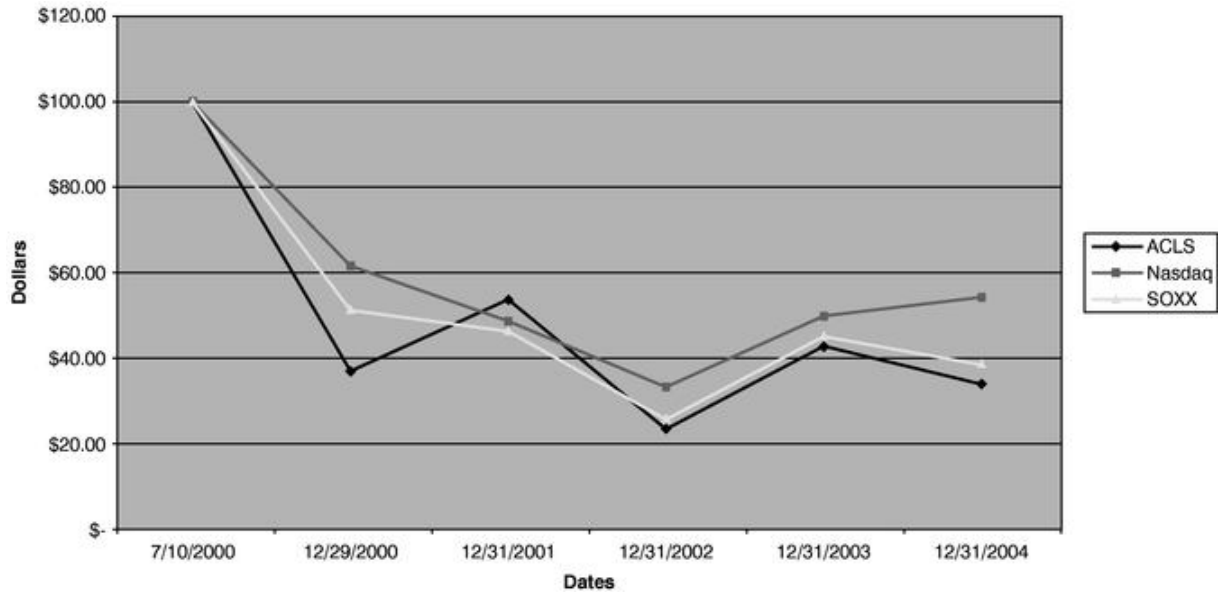
Compensation Committee Interlocks and Insider Participation

During 2004, the Compensation Committee of the Board of Directors consisted of Mr. Hardis, Mr. Cutler, Mr. Tooker and Mr. Thompson, as Chairman, none of who has been an officer or employee of Axcelis or had a relationship during 2004 requiring disclosure under Item 404 of Regulation S-K.

Stock Performance Graph

This graph compares the five-year cumulative total shareholder returns for our common stock to that of the Philadelphia Semiconductor Index (known as "SOXX") and the Nasdaq Composite Index. The cumulative returns are based on a \$100 investment on July 10, 2000 (the initial public trading date for Axcelis' common stock), with all dividends, if any, being reinvested. The stock performance shown on the graph below is not necessarily indicative of future price performance.

Performance Graph



Company/Index Name	July 10, 2000	December 29, 2000	December 31, 2001	December 31, 2002	December 31, 2003	December 31, 2004
Axcelis Technologies, Inc.	\$ 100.00	\$ 37.07	\$ 53.84	\$ 23.43	\$ 42.90	\$ 33.96
NASDAQ Composite Index	\$ 100.00	\$ 61.76	\$ 48.76	\$ 33.39	\$ 50.08	\$ 54.39
SOXX Index	\$ 100.00	\$ 51.32	\$ 46.47	\$ 25.74	\$ 45.22	\$ 38.56

Certain Relationships

Mr. Jennings temporarily served as chief executive officer of U.S. Interactive, Inc. from September 2000 until November 2000. U.S. Interactive, Inc. filed for bankruptcy protection in January 2001.

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 the fiscal year ended December 31, 2004, we believe that during the 2004 fiscal year, our directors, officers, and 10% stockholders complied with all Section 16(a) filing requirements.

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 (referred to herein as our "independent auditor") as independent auditors to conduct the annual audit of our financial statements for 2005 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 2004 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 as follows:

	2003	2004
Audit Fees	\$ 527,910	\$ 2,587,600
Audit Related Fees	\$ 86,500	\$ 60,000
Tax Fees		
Tax compliance and preparation	\$ 201,019	\$ 208,388
International tax planning	\$ 177,000	\$ 82,350
General tax planning and other tax	\$ 47,992	\$ 74,050
Total Tax Fees	\$ 426,011	\$ 354,660
All Other Fees		
Expatriate employee tax services	\$ 98,575	\$ 10,826
Acquisition due diligence	\$ 20,268	0
Total All Other Fees	\$ 118,843	\$ 10,826
Total Fees	\$ 1,159,264	\$ 3,023,214

Audit fees include a U.S. GAAP audit of Sumitomo Eaton Nova Corporation and statutory audits for subsidiaries and branches operating in countries outside of the United States. The increase in audit fees in 2004 as compared to 2003 consists principally of fees associated with attestation of Sarbanes

Oxley Act Section 404 compliance (\$1.0 million); general increases in fees for the audit of the Company's consolidated financial statements (\$.7 million) and increases in 2003 audit fees billed in 2004 (\$.3 million). Audit related fees include audits for the Company's 401(k) plan required under ERISA and, in 2003 and 2004, assistance in preparation for Sarbanes Oxley Act Section 404 compliance. 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. Expatriate employee tax services involve advice relating to, and administration of, tax equalization agreements between the Company and U.S. employees temporarily located in non-U.S. tax jurisdictions. As part of an on-going effort to reduce the non-audit services purchased from Ernst & Young, LLP, the Company terminated its purchase of expatriate employee tax services in 2003.

Our Audit Committee has adopted a policy and procedures requiring its pre-approval of all 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 approves the performance of specific services subject to cost limits for each service. Such general approvals are to be reviewed and, if necessary, modified at least annually. The policy also prohibits the independent auditor's performance of certain types of services as inconsistent with independence. Management must obtain the specific prior approval of the Audit Committee for each engagement of the independent auditor to perform other audit-related or other non-audit services.

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 2003 and 2004 fiscal year were pre-approved by the Audit Committee in accordance with this policy.

After reporting on these fees and services, Ernst & Young LLP informed the Company that they are not aware of any relationship with the Company that, in their professional judgement, 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 shares present or represented 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 2005 notwithstanding a negative stockholder vote.

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

DEADLINES FOR STOCKHOLDER PROPOSALS

Assuming the 2006 annual meeting is not more than 30 days before or 30 days after May 12, 2006, if you wish to bring business before or propose director nominations at the 2006 annual meeting, you must give written notice to Axcelis by February 11, 2006 (the date 90 days before the anniversary of the 2005 annual meeting).

If you intend to bring proposed business to the 2006 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 December 5, 2005 (120 days before the anniversary date of the mailing of this proxy statement), assuming the 2006 annual meeting is not more than 30 days before or 30 days after May 12, 2006.

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.

COMMUNICATIONS TO THE BOARD

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.



C/O EQUISERVE TRUST COMPANY N.A.
P. O. Box 8649
Edison, NJ 08818-8649

DETACH HERE IF YOU ARE RETURNING YOUR PROXY CARD BY MAIL

Please mark
votes as in
this example.

This proxy when properly executed will be voted in the manner directed herein. If no direction is made, this proxy will be voted FOR Proposals 1 and 2.

The Board of Directors recommends a vote FOR Company Proposals 1 and 2.

1. Election of Directors. (See reverse)	FOR ALL NOMINEES o	FOR o o	WITHHELD o o	WITHHELD FROM ALL NOMINEES o	2. Ratification of appointment of independent auditors.	FOR o	AGAINST o	ABSTAIN o
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For all nominees except as written above

All as more particularly described in the Proxy Statement relating to such meeting, receipt of which is hereby acknowledged.

Change of Address/Comments on Reverse Side.

Please sign this proxy exactly as name appears hereon. When shares are held by joint tenants, both should sign. When signing as attorney, administrator, trustee or guardian, please give full title as such.

Signature: _____ Date: _____ Signature: _____ Date: _____



AXCELIS TECHNOLOGIES, INC.

**THIS IS YOUR PROXY.
YOUR VOTE IS IMPORTANT.**

DO YOU NEED ASSISTANCE IN ANY OF THE FOLLOWING AREAS?

- **ADDRESS CHANGES—LEGAL TRANSFERS**
- **CONSOLIDATION OF ACCOUNTS—ELIMINATE MULTIPLE ACCOUNTS FOR ONE HOLDER AND CERTAIN DUPLICATE SHAREHOLDER MAILINGS GOING TO ONE ADDRESS.**

JUST CALL OUR TRANSFER AGENT'S TELEPHONE RESPONSE CENTER:

(781) 575-2725

OR WRITE TO:

EQUISERVE TRUST CO., N.A.

P. O. BOX 43069

PROVIDENCE, RI 02940-3069

DETACH HERE

**Proxy Solicited on Behalf of the Board of Directors of
Axcelis Technologies, Inc. for Annual Meeting on May 12, 2005.**

The undersigned hereby appoints Mary G. Puma, Stephen G. Bassett or Lynnette C. Fallon, or any of them, and any substitute or substitutes, to be the attorneys and proxies of the undersigned at the Annual Meeting of Stockholders of Axcelis Technologies, Inc. ("Axcelis") to be held at 11:00 a.m. EST on Thursday, May 12, 2005 at the offices of Axcelis at 108 Cherry Hill Drive, Beverly, Massachusetts, or at any adjournment thereof, and to vote at such meeting the shares of common stock of Axcelis the undersigned held of record on the books of Axcelis on the record date for the meeting for the election of the nominees listed below and on the ratification of Axcelis' independent auditors as described in the Proxy Statement, and on any other business before the meeting, with all powers the undersigned would possess if personally present.

Election of Directors, Nominees:
H. Brian Thompson
Stephen R. Hardis
R. John Fletcher

Independent Auditors:
Ernst & Young LLP

You are encouraged to specify your choices by marking the appropriate boxes, SEE REVERSE SIDE, but you need not mark any boxes if you wish to vote in accordance with the Board of Directors' recommendations. The proxies cannot vote your shares unless you sign and return this card.

PLEASE VOTE, DATE AND SIGN THIS PROXY ON THE OTHER SIDE AND RETURN PROMPTLY IN THE ENCLOSED ENVELOPE.

HAS YOUR ADDRESS CHANGED?

DO YOU HAVE ANY COMMENTS?

(If you have written in the above space, please mark the corresponding box on the reverse side of this card.)

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