

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

SCHEDULE 13G

Under the Securities Exchange Act of 1934

(Amendment No. 2)

NAME OF ISSUER: AXCELIS TECHNOLOGIES, INC.

TITLE OF CLASS OF SECURITIES: Common

CUSIP NUMBER: 054540109

Check the appropriate box to designate the rule pursuant to which this
Schedule is filed:

- Rule 13d-1(b)
 Rule 13d-1(c)
 Rule 13d-1(d)

CUSIP NO. 054540109

(1) Names of Reporting Persons MELLON FINANCIAL CORPORATION
SS or IRS Identification Nos. Of Above Person IRS No. 25-1233834

(2) Check the Appropriate Box if a Member of a Group (See Instructions)
(a) () (b) ()

(3) SEC use only

(4) Citizenship or Place of Organization Pennsylvania

| | | |
|---|------------------------------|-----------|
| Number of Shares Beneficially Owned by Each Reporting Person With | (5) Sole Voting Power | 2,822,494 |
| | (6) Shared Voting Power | 0 |
| | (7) Sole Dispositive Power | 2,711,218 |
| | (8) Shared Dispositive Power | 353 |

(9) Aggregate Amount Beneficially Owned by Each Reporting Person 2,867,177

(10) Check if the Aggregate Amount in Row (9) Excludes Certain
Shares (see Instructions) ()

(11) Percent of Class Represented by Amount in Row (9) 2.85

(12) Type of Reporting Person (See Instructions) HC

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Item 1(a) Name of Issuer: AXCELIS TECHNOLOGIES, INC.

Item 1(b) Address of Issuer's Principal Executive Offices:
108 Cherry Hill Drive
Beverly, Massachusetts 01915

Item 2(a) Name of Person Filing: Mellon Financial Corporation and any other
reporting person(s) identified on the
second part of the cover page(s) and
Exhibit I.

Item 2(b) Address of Principal Business Office, or if None, Residence:
c/o Mellon Financial Corporation
One Mellon Center
Pittsburgh, Pennsylvania 15258

(for all reporting persons)

- Item 2(c) Citizenship: See cover page and Exhibit I.
- Item 2(d) Title of Class of Securities: Common
- Item 2(e) CUSIP Number: 054540109
- Item 3 See Item 12 of cover page(s) ("Type of Reporting Person") for each reporting person.

BK = Bank as defined in Section 3(a)(6) of the Act

IV = Investment Company registered under Section 8 of the Investment Company Act of 1940

IA = Investment Advisor registered under Section 203 of the Investment Advisors Act of 1940

EP = Employee Benefit Plan, Pension Fund which is subject to the provisions of the Employee Retirement Income Security Act of 1974 or Endowment Fund; see Section 240.13-d(1)(b)(1)(ii)(F)

HC = Parent Holding Company, in accordance with Section 240.13-d(1)(b)(1)(ii)(G)

- Item 4 Ownership: See Item 5 through 9 and 11 of cover page(s) as to each reporting person.

The amount beneficially owned includes, where appropriate, securities not outstanding which are subject to options, warrants, rights or conversion privileges that are exercisable within 60 days. The securities reported herein as beneficially owned may exclude securities of the issuer with respect to which voting and/or dispositive power is exercised by subsidiaries of Mellon Financial Corporation, or departments or units thereof, independently from the exercise of those powers over the securities reported herein. See SEC Release No. 34-39538(January 12, 1998). The filing of this Schedule 13G shall not be construed as an admission that Mellon Financial Corporation, or its direct or indirect subsidiaries, including Mellon Bank, N.A., are for the purposes of Section 13(d) or 13(g) of the Act, the beneficial owners of any securities covered by this Schedule 13G.

The following information applies if checked: () Mellon Bank, N.A. is the trustee of the issuer's employee benefit plan (the "Plan"), which is subject to ERISA. The securities reported include all shares held of record by Mellon Bank, N.A. as trustee of the Plan which have not been allocated to the individual accounts of employee participants in the Plan. The reporting person, however, disclaims beneficial ownership of all shares that have been allocated to the individual accounts of employee participants in the Plan for which directions have been received and followed.

- Item 5 Ownership of Five Percent or Less of a Class: If this statement is being filed to report the fact that as of the date hereof the reporting person has ceased to be the beneficial owner of more than five percent of the class of securities, check the following (X)

Item 6 Ownership of More than Five Percent on Behalf of Another Person: All of the securities are beneficially owned by Mellon Financial Corporation and direct or indirect subsidiaries in their various fiduciary capacities. As a result, another entity in every instance is entitled to dividends or proceeds of sale. The number of individual accounts holding an interest of 5% or more is ()

- Item 7 Identification and Classification of the Subsidiary Which Acquired the Security Being Reported by the Parent Holding Company: See Exhibit I.

Item 8 Identification and Classification of Members of the Group: N/A

Item 9 Notice of Dissolution of Group: N/A

Item 10 Certification: By signing below I certify that, to the best of my knowledge and belief, the securities referred to above were acquired and are held in the ordinary course of business and were not acquired and are not held for the purpose of and do not have the effect of changing or influencing the control of the issuer of such securities and were not acquired and are not held in connection with or as a participant in

any transaction having such purpose or effect.

SIGNATURE

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct. This filing is signed by Mellon Financial Corporation on behalf of all reporting entities pursuant to Rule 13d-1(f)(1) promulgated under the Securities and Exchange Act of 1934, as amended.

Date: January 10, 2005

MELLON FINANCIAL CORPORATION

By: /s/ DAVID BELSTERLING

David Belsterling
First Vice President
Mellon Bank, N.A.
Attorney-In-Fact for
Mellon Financial Corporation

EXHIBIT I

The shares reported on the attached Schedule 13G are beneficially owned by the following direct or indirect subsidiaries of Mellon Financial Corporation, as marked (X):

(A) The Item 3 classification of each of the subsidiaries listed below is "Item 3(b) Bank as defined in Section 3(a)(6) of the Act."

- (X) Mellon Trust of New England, National Association (parent holding company of Franklin Portfolio Associates, LLC, TBCAM Holdings, Inc. and The Boston Company Asset Management, LLC)
- (X) Mellon Trust of Delaware, National Association
- (X) Mellon Bank, N.A. (parent holding company of Mellon Equity Associates, LLP, Laurel Capital Advisors, LLP, and Mellon Trust of Delaware, National Association)
- () Mellon Trust of California
- () Mellon Trust of New York, LLC
- () Mellon Private Trust Company, National Association
- () Mellon Trust of Washington

(B) The Item 3 classification of each of the subsidiaries listed below is "Item 3(e) Investment Advisor registered under Section 203 of the Investment Advisors Act of 1940."

- () Boston Safe Advisors, Inc.
- () Dreyfus Investment Advisors, Inc.
- () Founders Asset Management LLC
- () Franklin Portfolio Associates LLC
- () Laurel Capital Advisors, LLP
- (X) Mellon Capital Management Corporation
- (X) Mellon Equity Associates, LLP
- () Mellon Global Investment Limited
- () Mellon HBV Alternative Strategies LLC
- () Newton Capital Management Limited
- () Newton Fund Managers Limited
- () Newton International Investment Management Limited
- () Newton Investment Management Limited
- (X) The Dreyfus Corporation (parent holding company of Dreyfus Investment Advisors, Inc. and Dreyfus Service Corporation)
- (X) The Boston Company Asset Management, LLC
- () Standish Mellon Asset Management Company LLC
- () Dreyfus Service Corporation (parent holding company of Boston Safe Advisors, Inc. and Founders Asset Management LLC)

(C) The Item 3 classification of each of the legal entities listed below is "Item 3(g) Parent Holding Company, in accordance with Section 240.13d-I(b)(ii)(G)."

- (X) MBC Investments Corporation (parent holding company of Mellon Capital Management Corporation and Mellon UK Holdings)
- (X) Mellon Financial Corporation
- () Newton Management Limited (parent holding company of all Newton entities listed in (b) above)

- () The Boston Company, Inc. (parent holding company of Mellon Trust of California, Mellon Private Trust Company, National Association, Mellon Trust of New York, LLC and Mellon Trust of Washington)
- () Fixed Income (DE) Trust (parent holding company of Fixed Income (MA) Trust and Standish Mellon Asset Management Company LLC)
- () Fixed Income (MA) Trust (parent holding company of Standish Mellon Asset Management Company LLC)

NOTE: ALL OF THE LEGAL ENTITIES LISTED UNDER (A) AND (B) ABOVE ARE DIRECT OR INDIRECT SUBSIDIARIES OF MELLON FINANCIAL CORPORATION. BENEFICIAL OWNERSHIP OF MORE THAN FIVE PERCENT OF THE CLASS BY ANY ONE OF THE SUBSIDIARIES OR INTERMEDIATE PARENT HOLDING COMPANIES LISTED ABOVE IS REPORTED ON A JOINT REPORTING PERSON PAGE FOR THAT SUBSIDIARY ON THE ATTACHED SCHEDULE 13G AND IS INCORPORATED IN THE TOTAL PERCENT OF CLASS REPORTED ON MELLON FINANCIAL CORPORATION'S REPORTING PERSON PAGE. (DO NOT ADD THE SHARES OR PERCENT OF CLASS REPORTED ON EACH JOINT REPORTING PERSON PAGE ON THE ATTACHED SCHEDULE 13G TO DETERMINE THE TOTAL PERCENT OF CLASS FOR MELLON FINANCIAL CORPORATION).