

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

FORM 12b-25

NOTIFICATION OF LATE FILING

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SEC FILE NUMBER 000-30941
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(Check one):       Form 10-K                       Form 20-F                       Form 11-K                       Form 10-Q                       Form 10-D  
                          Form N-SAR                       Form N-CSR

For Period Ended:      December 31, 2008  
 Transition Report on Form 10-K  
 Transition Report on Form 20-F  
 Transition Report on Form 11-K  
 Transition Report on Form 10-Q  
 Transition Report on Form N-SAR  
For the Transition Period Ended: \_\_\_\_\_

*Read Instruction (on back page) Before Preparing Form. Please Print or Type.*  
**Nothing in this form shall be construed to imply that the Commission has verified any information contained herein.**

If the notification relates to a portion of the filing checked above, identify the Item(s) to which the notification relates:  
\_\_\_\_\_

**PART I — REGISTRANT INFORMATION**

**Axcelis Technologies, Inc.**

Full Name of Registrant

Former Name if Applicable

**108 Cherry Hill Drive**

Address of Principal Executive Office (*Street and Number*)

**Beverly, MA 01915**

City, State and Zip Code

**PART II — RULES 12b-25(b) AND (c)**

If the subject report could not be filed without unreasonable effort or expense and the registrant seeks relief pursuant to Rule 12b-25(b), the following should be completed. (Check box if appropriate)

- (a) The reason described in reasonable detail in Part III of this form could not be eliminated without unreasonable effort or expense;
- (b) The subject annual report, semi-annual report, transition report on Form 10-K, Form 20-F, Form 11-K, Form N-SAR or Form N-CSR, or portion thereof, will be filed on or before the fifteenth calendar day following the prescribed due date; or the subject quarterly report or transition report on Form 10-Q or subject distribution report on Form 10-D, or portion thereof, will be filed on or before the fifth calendar day following the prescribed due date; and
- (c) The accountant's statement or other exhibit required by Rule 12b-25(c) has been attached if applicable.

**PART III — NARRATIVE**

State below in reasonable detail why Forms 10-K, 20-F, 11-K, 10-Q, 10-D, N-SAR, N-CSR, or the transition report or portion thereof, could not be filed within the prescribed time period.

Axcelis Technologies, Inc. (the "Company") is unable to file its Annual Report on Form 10-K for the period ended December 31, 2008 within the prescribed time period without unreasonable effort and expense because extra time is needed to determine the amount by which the Company's long-lived assets and goodwill have been impaired. In connection with the preparation of the financial statements for the fiscal year ended December 31, 2008, and following discussions with the Audit Committee, management concluded that, due to the continuing downturn in the semiconductor industry and the global economy, the Company's long-lived assets and goodwill have been impaired. The Company has experienced resource limitations that, along with management's focus on the business implications of the default on its debt and the complex calculations required to measure impairment, have delayed completion of the valuations required to determine the extent of the impairment charges and delayed the preparation of our financial statements. The Company expects to file the Form 10-K on or before March 31, 2009, the fifteenth calendar day following the prescribed due date.

**PART IV — OTHER INFORMATION**

(1) Name and telephone number of person to contact in regard to this notification

**Stephen G. Bassett**

(Name)

**(978)**

(Area Code)

**787-4000**

(Telephone Number)

(2) Have all other periodic reports required under Section 13 or 15(d) of the Securities Exchange Act of 1934 or Section 30 of the Investment Company Act of 1940 during the preceding 12 months or for such shorter period that the registrant was required to file such report(s) been filed? If answer is no, identify report(s).

Yes  No

(3) Is it anticipated that any significant change in results of operations from the corresponding period for the last fiscal year will be reflected by the earnings statements to be included in the subject report or portion thereof?

Yes  No

If so, attach an explanation of the anticipated change, both narratively and quantitatively, and, if appropriate, state the reasons why a reasonable estimate of the results cannot be made.

The Company expects to recognize revenue of \$250.2 million for the 2008 fiscal year, compared to \$404.8 million for the 2007 fiscal year. The Company expects operating expenses for the 2008 fiscal year, exclusive of the impairment charge described below, to be approximately \$160.4 million, compared to \$173.5 million for the 2007 fiscal year. The Company expects to record impairment charges and charges for excess inventory ranging between \$99.0 million and \$127.0 million for the 2008 fourth quarter and 2008 fiscal year. (The Company does not anticipate any future cash expenditures in connection with these impairment charges.) Inclusive of these charges, the Company expects to record a net loss ranging between approximately \$129.2 million and \$157.2 million for the 2008 fourth quarter compared with a net loss of \$10.6 million for the 2007 fourth quarter; and a net loss ranging between approximately \$184.5 million and \$212.5 million for the 2008 fiscal year compared with a net loss of \$11.4 million for the 2007 fiscal year. The foregoing results are estimates only and are subject to change following the completion of management's review.

The Company and U.S. Bank National Association, as trustee (the "Trustee"), are parties to an Indenture dated as of May 2, 2006 (the "Indenture") relating to the Company's 4.25% Convertible Senior Subordinated Notes (the "Senior Subordinated Notes"). Under the Indenture, the Company was required to repay the outstanding principal amount of the Senior Subordinated Notes plus a maturity premium and accrued interest (a total of approximately \$85 million) on January 15, 2009. The Company failed to make the required payment, which constitutes an event of default under the Indenture. Pursuant to the Indenture and as a result of the Company's failure to make the required payment, the Company is required to pay, upon demand of the Trustee, the entire overdue amount, plus interest at a rate of 8.0% per annum, plus certain additional costs and expenses associated with the collection of such amounts. In January 2009, the Trustee filed a complaint in US District Court in New York seeking a judgment for the amount due on the Senior Subordinated Notes. The Company acknowledges the debt and has been engaged in various efforts to obtain liquidity to allow repayment to the debt holder.

On February 26, 2009, the Company, Sumitomo Heavy Industries, Ltd. ("SHI") and SEN Corporation, an SHI and Axcelis Company ("SEN") entered into a Share Purchase Agreement pursuant to which the Company will sell and SHI will buy all of the Company's common shares in SEN in exchange for a cash payment of 13 billion Yen on the later of March 31, 2009 or the date on which certain closing conditions are satisfied. On March 2, 2009, the Company purchased a foreign exchange option to hedge the proceeds from the transaction. The option insures proceeds of approximately \$132.7 million before advisor fees and other expenses. A portion of the net proceeds under the Share Purchase Agreement will be used to discharge the Company's obligations under the 4.25%

2

Convertible Senior Subordinated Notes. The Company expects the sale of its investment in SEN to close on March 31, 2009. Management is currently evaluating whether there is substantial doubt about the Company's ability to continue as a going concern through December 31, 2009 if we do close this transaction. Should this transaction fail to close by March 31, 2009, due to the fact that the Company's debt will continue to be in default because the Company will not have the ability to repay it, the Form 10-K will disclose that there is substantial doubt about the Company's ability to continue as a going concern through December 31, 2009. No assurances can be given that the closing will occur on March 31, 2009 or at all.

The foregoing statements about the anticipated timing of the Form 10-K and the Company's expected results of operations, including the amounts and ranges of the various impairment charges in the aggregate, are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These forward-looking statements are based upon information presently available to the Company and assumptions that it believes to be reasonable. Investors are cautioned that all such statements involve risks and uncertainties, including the risks that additional resources and time may be needed to complete and file the Form 10-K, that the Company will not be able to consummate the sale of its investment in SEN, and that the Company's actual operating results may differ materially from these estimates upon completion of management's review of the financial statements.

3

**Axcelis Technologies, Inc.**

(Name of Registrant as Specified in Charter)

has caused this notification to be signed on its behalf by the undersigned hereunto duly authorized.

Date: March 16, 2009

By: /s/ Stephen G. Bassett

Stephen G. Bassett

Executive Vice President and Chief Financial Officer

4