



DIVISION OF
CORPORATION FINANCE

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

November 1, 2013

Via E-mail

Kevin J. Brewer
Executive Vice President and Chief Financial Officer
Axcelis Technologies, Inc.
108 Cherry Hill Drive
Beverly, MA 01915

**Re: Axcelis Technologies, Inc.
Form 10-K for the Fiscal Year Ended December 31, 2012
Filed March 1, 2013
File No. 000-30941**

Dear Mr. Brewer:

We have reviewed your filing and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter within ten business days by providing the requested information or by advising us when you will provide the requested response. If you do not believe our comments apply to your facts and circumstances, please tell us why in your response.

After reviewing the information you provide in response to these comments, we may have additional comments.

Form 10-K for the Fiscal Year Ended December 31, 2012

Item 8. Financial Statements

Note 6. Inventories, net, page F-14

1. Please describe how you assessed the recoverability of dry strip inventory as of December 31, 2012 for possible impairment. Please also clarify how the assumptions inherent in that assessment changed during the six months ended June 30, 2013 which led to the \$2.1 million impairment as described on page 9 of your Form 10-Q for the fiscal quarter ended June 30, 2013.

Note 13. Stock Award Plans and Stock Based Compensation, page F-18

2. For stock options granted after July 1, 2012, the company started using the simplified method for estimating the expected life of options. Previously, the company used a forward looking lattice model. Please respond to the following:
- Please tell us why the company switched from a forward looking lattice model to the simplified method for estimating the expected term for options granted after July 1, 2012. Refer to Question 6 of SAB Topic 14.
 - Please tell us how the company applied FASB ASC 718-10-55-34 and Question 4 of SAB Topic 14 in determining the expected term of the options.
 - Given that employee stock options do not typically vest until four years, please explain why the lower end of the range is below four years. Refer to Question 3 of SAB Topic 14.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes the information the Securities Exchange Act of 1934 and all applicable Exchange Act rules require. Since the company and its management are in possession of all facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

In responding to our comments, please provide a written statement from the company acknowledging that:

- the company is responsible for the adequacy and accuracy of the disclosure in the filing;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filing; and
- the company may not assert staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

You may contact Kevin Kuhar, Accountant, at (202) 551-3662 or Kate Tillan, Assistant Chief Accountant, at (202) 551-3604 if you have questions regarding comments on the financial statements and related matters. In this regard, do not hesitate to contact me at (202) 551-3671 with any other questions.

Sincerely,

/s/ Kate Tillan for

Martin James
Senior Assistant Chief Accountant