



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

DIVISION OF
CORPORATION FINANCE

July 30, 2010

Mary G. Puma
Chief Executive Officer
Axcelis Technologies, Inc.
108 Cherry Hill Drive
Beverly, Massachusetts 01915

Re: Axcelis Technologies, Inc.
Form 10-K for fiscal year ended December 31, 2009
Filed March 15, 2010
File No. 000-30941

Dear Ms. Puma:

We have limited our review of your filing to those issues we have addressed in our 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.

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

1. Based upon our review of the Part III information that you have incorporated by reference from your proxy statement into your Form 10-K, it does not appear that you included any disclosure in response to Item 402(s) of Regulation S-K in your proxy statement. Please advise us of the basis for your conclusion that such disclosure was not necessary and describe the process you undertook to reach that conclusion.

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.

Mary G. Puma
Axcelis Technologies, Inc.
July 30, 2010
Page 2

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 Tim Buchmiller at (202) 551-3635 or Ruairi Regan at (202) 551-3269 if you have any questions.

Sincerely,

Russell Mancuso
Branch Chief

cc (via fax): Lynnette C. Fallon, Esq.