



Axcelis Technologies, Inc.
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FILED BY EDGAR

United States Securities and Exchange Commission
Washington, D.C. 20549
Attn: Russell Mancuso, Branch Chief

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

Dear Sir or Madam:

This letter is in response to your comment letter to Mary G. Puma, Chief Executive Officer of Axcelis Technologies, Inc. ("Axcelis" or the "Company") dated July 30, 2010 signed by Russell Mancuso, Branch Chief (the "Comment Letter"). The response contained herein is numbered to correspond to the number used in the Comment Letter.

1. Based upon our review of the Part III information that you have incorporated by references 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.

Response:

In response to the Staff's comment, the Company advises the Staff that, prior to filing the Company's Definitive Proxy Statement on Schedule 14A, management (including representatives from human resources, legal and finance departments and the Chief Executive Officer) considered the Company's compensation policies and practices for its employees to determine if these policies and practices give rise to risks that are reasonably likely to have a material adverse effect on the Company. This assessment included (i) a review of the Company compensation program's policies and practices, (ii) identification of risks, if any, related to the programs, (iii) consideration of the materiality of a potentially risk-related reward to the total

compensation provided to the individual, and (iv) identification of those aspects of the program and its oversight that provide risk control. Although all compensation programs were considered, management's review focused on the programs with variability of payout and in which there is a potential for the participant to directly affect payout.

Based on this review, management determined that the compensation policies and practices for Axcelis' employees do not create risks that are reasonably likely to have a material adverse effect on the Company, principally because:

(1) Base pay is a material component of all employees' total compensation package, so those employees who receive incentive compensation have a total compensation package that is balanced; and

(2) Our incentive compensation programs are subject to appropriate risk controls in their design and oversight:

- The Company's internal controls and risk management practices restrict risk-taking that is not consistent with senior management's determinations on appropriate risk;
- Payment of small bonuses for extraordinary effort or for achieving individual or team goals are subject to approval by direct managers, and representatives of human resources and finance departments, and, for higher amounts, a representative of senior management;
- Payment of sales commission plans are subject to calculation and approval by the finance department and are tied to actual receipt of payments from the customer;
- The Company's annual cash incentive plans have a balanced array of performance measures established by the Compensation Committee of the Board of Directors and which include both qualitative and quantitative assessments of performance;
- Achievement of the objectives under the Company's annual cash incentive plans is first determined by senior management and the finance department and then approved by the Compensation Committee of the Board of Directors prior to payment.

Accordingly, the Company concluded that no disclosure in response to Item 402(s) of Regulation S-K was necessary.

As requested in the Comment Letter, the Company acknowledges that:

- a. the company is responsible for the adequacy and accuracy of the disclosure in the filings discussed in the Comment Letter (the "filings");
- b. staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filings; and

- c. 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.

If you have any questions or request additional information, please do not hesitate to contact the undersigned at 978-787-4120

Very truly yours,

/s/ Lynnette C. Fallon

Executive Vice President HR/Legal, General Counsel and Secretary

Courtesy copies:

Mary G. Puma, Axcelis
Stephen G. Bassett, Axcelis