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November 15, 2013

FILED BY EDGAR

United States Securities and Exchange Commission
Mail Stop 6010
Washington, D.C. 20549
Attn: Martin James, Senior Assistant Chief Accountant

Re: Axcelis Technologies, Inc. Form 10-K for the fiscal year ended December 31, 2012; Filed March 1, 2013 — No. 000-30941

Dear Sir or Madam:

This letter is in response to your comment letter to Kevin J. Brewer, Executive Vice President and Chief Financial Officer of Axcelis Technologies, Inc. (“Axcelis” or the “Company”) dated November 1, 2013 signed by Martin James, Senior Assistant Chief Accountant (the “Comment Letter”). The responses contained herein are numbered to correspond to the numbers used in the Comment Letter.

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.

Response:

In response to the Staff’s comment, the Company advises the Staff that the Company’s assessment of the recoverability of dry strip inventory changed significantly based on new information obtained after the filing on March 1, 2013 of the Form 10-K for the fiscal year ended December 31, 2012 (the “Form 10-K”).

The determination of excess or obsolete inventory requires the Company to estimate the future demand for its products. During the fourth quarter of 2012, the Company performed a comprehensive review and analysis of its worldwide inventory levels based on historic and projected inventory requirements for all of its products, components and parts. This analysis which was primarily driven by the Company’s internal projections and the factors discussed below was supported by industry outlook indicating that the semiconductor industry downturn would continue into 2013. As a result, the Company recorded a \$13.4 million increase to inventory reserves in the fourth quarter of 2012. This is disclosed in Note 6 of the 2012 financial statements included in the Form 10-K.

The Company’s inventory excess and obsolescence analysis as of December 31, 2012 took into account the December 2012 sale of certain intellectual property and other assets related to the Company’s dry strip product line to Lam Research Corporation which was also disclosed in the footnotes in the Form 10-K. The contractual arrangement associated with the Lam sale provided for a 270 day transition period that extended into September 2013, during which the Company had the ability to accept purchase orders for the sale of 300 mm dry strip tools for a period of 180 days and these tools were required to ship within a further 90 days. In addition, the contract allowed the Company to sell certain 200 mm dry strip tools until December 2015 and to provide aftermarket support (spares, services, etc.) for the current installed base of both 300 mm and 200 mm systems in perpetuity. The Company considered the impact of the Lam sale in its inventory excess and obsolescence analysis as of December 31, 2012. At December 31, 2012, the recovery of \$5.0 million of dry strip inventory was supported by forecasts to support aftermarket needs and an annual plan for 2013 that assumed the sale of 300 mm units during the transition period to key customers. Accordingly, the Company concluded that there was no reserve required for the 300 mm dry strip inventory as of December 31, 2012.

The charge recorded in the period ended December 31, 2012, as well as the Company’s expectations regarding the recoverability of the remaining dry strip inventory, were based on system bookings at the time of the filing of the Form 10-K on March 1, 2013 as well as the Company’s annual plan for 2013 and a three year strategic plan, which were developed using historical customer purchasing patterns, feedback from key customers, and industry data supporting projected capital spending.

After the filing of the Form 10-K and prior to the filing of the Company’s Form 10-Q for the three months ended March 31, 2013 (filed on May 6, 2013), the Company received new information from key 300 mm dry strip customers that indicated that certain 300 mm product sales that had been included in the annual plan would not occur within the contractual transition period. This new information prompted the Company to review its 2013 annual plan inputs and, therefore, the salability of the 300 mm dry strip inventory. The Company concluded that there

was not a high probability of new orders within the transition period and, accordingly, reconsidered the need for a reserve against the 300 mm dry strip inventory. As a result, the Company recorded a \$2.1 million charge, specific to the 300 mm product line, which represented the value of inventory no longer expected to be recoverable as of March 31, 2013. The remaining dry strip inventory of \$2.9 million was projected to be recoverable through aftermarket support needs for the existing installed base of dry strip customers, and consists primarily of spare parts inventory to support these needs. The Company included the following disclosure on page 9 of its Form 10-Q for the fiscal quarter ended March 31, 2013, “During the three months ended March 31, 2013, the Company recorded a charge to cost of sales of \$2.1 million for 300mm dry strip components. Under the terms of the agreement with Lam, the Company was permitted to manufacture and sell dry strip products through September 2013. Due to changes in the forecasted sales of the Company’s dry strip products that become known in the current period, a portion of the dry strip inventory components were determined to be non-recoverable”. A similar disclosure was included on page 9 of Form 10-Q for the fiscal quarter ended June 30, 2013.

The conclusion that a reserve for 300 mm dry strip inventory was not needed at December 31, 2012 was based on information available to the Company at that date through the filing date of the Form 10-K. The Company’s conclusion that a reserve was required for a portion of the 300 mm dry strip inventory at March 31, 2013, was based on new information available subsequent to the filing of the Form 10-K on March 1, 2013 and prior to the filing of Form 10-Q for the period ended March 31, 2013 on May 6, 2013 and, therefore, the charge was recorded in the period ended March 31, 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.

Response

In response to the Staff’s comments the Company advises the Staff of the following:

- As indicated in Question 6 of SAB Topic 14 and related discussion, the use of the “simplified” method for “plain vanilla” options is allowed if a company concludes that due to significant changes to the terms of its option grants, its historical share option exercise experience would no longer provide a reasonable basis upon which to estimate expected term. For grants subsequent to July 1, 2012, the life of the options was shortened from ten years to seven years with all other vesting provisions remaining consistent with earlier grants. As seven year options had not been offered by the Company before, the Company determined that the historical share option exercise experience would no longer be reliable and concluded that using the simplified method was appropriate until adequate history has been established for the seven year options. As more detailed historical information about exercise behavior for the seven year options becomes available over time, the Company expects that it will not continue to utilize the simplified method to estimate the expected term. Accordingly, the Company has used the simplified method to expense option award grants subsequent to July 1, 2012. The Company will continue to use the simplified method until sufficient historical data regarding exercise behavior for seven year awards is available.
- Both ASC 718-10-55-34 and Question 4 of SAB Topic 14 provide that an entity should aggregate individual awards into relatively homogenous groups for the purpose of determining expected term. With respect to the 2012 Equity Incentive Plan adopted in May 2012, the Company has two groupings: employees with a four year vesting period, and non-employee directors with a six month vesting period, as noted in Note 13(a), paragraph four in the Form 10-K. The Company also considered treating employees and executives as separate groups. However, historical information indicated that exercise behavior was similar between these individuals. Therefore, the Company believes that only the employee and independent director groupings are relatively homogenous groups in terms of exercise and post-vesting employment termination behaviors for the purpose of determining expected term and that is consistent with the guidance in ASC 718-10-55-34 and Question 4 of SAB Topic 14.
- As noted in Question 3 of SAB Topic 14, a company cannot use an expected term that is less than the vesting period. As noted above, the Company currently has two groupings: employees with a four year vesting period, and non-employee directors with a six month vesting period. The lower end of the range in the disclosure on page F-19 in the Form 10-K (i.e., 3.8 years) relates to the non-employee directors’ options, with a six month vesting period.

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 978-787-9551

Very truly yours,

/s/ Kevin J. Brewer

Kevin J. Brewer

Executive Vice President and Chief Financial Officer

Courtesy copies:

Mary G. Puma, Axcelis