



April 14, 2008

Dear Axcelis shareholder,

With the Axcelis Annual Meeting of Shareholders upcoming on May 1, 2008, we want to update you on the company's progress, share with you the Board's current perspective of Axcelis' business potential, and comment on the proposed unsolicited offer to acquire Axcelis by SHI.

Market conditions in the semiconductor industry remain very weak. This market weakness has impacted our business as well as that of our competitors. Many of our customers have delayed capital spending for semiconductor equipment and pushed out major projects at least several quarters. While we are confident that the market will indeed strengthen in the future, timing for improvement is uncertain, particularly in light of the broad economic uncertainty of the moment.

Axcelis continues to make good progress in product development and introduction. We are working closely with customers to design in our new products so that we are well positioned when the market does turn up. For example:

- Axcelis is receiving further positive feedback from our customers regarding the Optima HD as the tool continues to outperform the competition head-to-head in high volume manufacturing at a major memory customer. In fact, we recently received an order from this customer for a fifth standard Optima HD, further demonstrating the value of our single wafer high current solution. We expect to begin receiving a meaningful share of this customer's high current business, as well as gain traction with other memory, logic and foundry customers as fab utilization begins to increase and the industry recovers.
- Axcelis has also run multiple demos of the Optima XE, our new single wafer high energy offering, for both existing and new high energy customers. The response has been quite good and supports our expectation that we will maintain our leadership in this segment. We are ahead of the market demand for this technology and plan to commence shipping the Optima XE this quarter.
- The Company will soon launch our new Integra RS dry strip system, which we expect will increase our overall market position in the cleaning space. Our customers are excited about the innovative design of our tool, which combines unmatched productivity with superior process performance. It is our view that the

Integra RS will become the benchmark by which all other dry strip systems are measured.

While our progress is encouraging, there is clearly more work to be done to regain our rightful market share in implant and forge ahead of our competition in dry strip. Although it is difficult during this market slow down to translate this progress quickly into improved financial performance, Axcelis management remains keenly focused on execution to ensure that we deliver customers winning new products that drive profitable growth.

On March 17, 2008, the Board rejected Sumitomo Heavy Industries, Ltd.'s unsolicited proposal to acquire Axcelis at \$6.00 per share. Given that SHI is communicating its views to shareholders and the media, we feel that it's important that you understand our perspective in making this decision. We have been aware, for many years, that a "one company" approach combining Axcelis and SEN could yield significant operational and commercial synergies, and we have on several previous occasions sought unsuccessfully to engage in such discussions. However, based on our view of current market conditions and of the company's prospects when market conditions do improve, we felt it would not be in the best interests of our shareholders to accept the most recent SHI acquisition proposal. At the same time, we stated that we were ready to meet with SHI, on a private and confidential basis, to explore whether we could reach a mutually beneficial transaction to optimize return to our shareholders. However, thus far we have been unable to reach an agreement with SHI on appropriate terms for such discussions.

- Axcelis feels strongly that in order to engage in serious, productive discussions, significant confidential information must be shared between the parties. As we noted in an earlier press release, we have been ready to share confidential information with SHI on customary terms since 2006. However, we believe it is imperative that both SHI and Axcelis agree to keep the content of such conversations private, and to agree not to pursue actions in the public stock market based on any non-public disclosures between the parties. To this end, we proposed a customary confidentiality and standstill agreement to SHI that sought to protect Axcelis' confidential information and the content of our negotiations for a reasonable period of time. Since sending the draft agreement, we also have proposed several compromises in an effort to reach a conclusion on the agreement and begin discussions with SHI.
- SHI, however, has been unwilling to agree that it will keep our discussions private. SHI has also been unwilling to agree that, after receiving confidential information from us, it will not immediately turn around and commence an unsolicited tender offer or a proxy fight or start a creeping accumulation of our shares. Given SHI's unwillingness to agree to the most basic and customary protections, to date we have been unable to commence discussions with them.
- We are concerned that at this point, SHI may be trying to use you, our shareholders, as a tool to pressure the Board by advocating that you withhold votes for our director

nominees. The Board rejected SHI's \$6.00 per share offer, which SHI has said it does not intend to increase, because we continue to believe that this offer significantly undervalues the Company. While we are ready to have discussions with SHI, the fact that SHI will not agree to reasonable terms for those discussions, and that it continues to lobby our shareholders for withhold votes, suggests that SHI may now simply be trying to gain negotiating leverage.

- As you know, SHI owes our shareholders no duties, and it is in SHI's interest to try to acquire Axcelis at the lowest possible price. We ask that you consider the ramifications of SHI's approach so that you may act in a manner that serves your best interest. In turn, we will continue to commit to discussions with SHI at such time as SHI is ready to agree to reasonable terms for those discussions, and we will continue to be open to all reasonable solutions.

Our priority as directors of Axcelis is to optimize the value of Axcelis' business and, in turn, the company's value to all shareholders. The Board intends to do whatever the facts and reasonable assumptions lead us to conclude is right to accomplish these goals.

We hope to have your support at the 2008 annual meeting and beyond.

Sincerely,

Mary G. Puma
Chairman of the Board,
Chief Executive Officer and President

Stephen R. Hardis
Lead Director

H. Brian Thompson
Director

R. John Fletcher
Director

William C. Jennings
Director

Patrick H. Nettles
Director

Geoffrey Wild
Director

This letter contains statements about Axcelis' plans and potential performance and the development of our products and markets. These are forward-looking statements that involve risks and uncertainties. Actual events or results may differ materially from those described in the forward-looking statements due to a number of important factors involving risks and uncertainties. The potential risks and uncertainties include, but are not limited to: whether Axcelis' new products will meet customers' technological and

timing requirements, the impact of the cyclical nature of the semiconductor industry, Axcelis' ability to keep pace with rapid technological changes in the semiconductor manufacturing processes, the impact of the highly competitive nature of the semiconductor equipment industry, quarterly fluctuations in operating results attributable to the timing and amount of orders for our products and services, Axcelis' dependence on SEN (Axcelis' Japanese joint venture) for access to the Japanese semiconductor equipment market, and Axcelis' ability to obtain necessary financing on acceptable terms, including without limitation its ability to repay the outstanding convertible debt. Further risks and uncertainties associated with Sumitomo Heavy Industries' unsolicited proposal to acquire Axcelis include: the risk that key employees may leave for other employment opportunities due to concerns for their employment security with Axcelis, the risk of creating uncertainty and disruption in customers' purchasing plans, the risk that the acquisition proposal will make it more difficult for Axcelis to execute its strategic plan and pursue other strategic opportunities, and the risk that stockholder litigation in connection with Sumitomo Heavy Industries' unsolicited proposal may result in significant costs of defense, indemnification and liability. If any of those or other risks or uncertainties materializes, Axcelis' business, financial condition and results of operations could be seriously harmed and the trading price of its common stock could decline. More information about potential factors that could affect Axcelis' business and financial results is included under the captions "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" in the Company's Annual Report on Form 10-K for the year ended December 31, 2007, which is on file with the SEC and available at the SEC's website at www.sec.gov. All forward-looking statements are qualified by these cautionary statements and are made only as of the date they are made. The Company is under no obligation (and expressly disclaims any such obligation) to update or alter any forward-looking statements, whether as a result of new information, future events or otherwise, except as may be required by law.