



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

DIVISION OF
CORPORATION FINANCE

August 9, 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 completed our review of your Annual Report on Form 10-K and do not have any further comments at this time. If you have any questions please contact Ruairi Regan at (202) 551-3269 or Tim Buchmiller at (202) 551-3635.

Sincerely,

Russell Mancuso
Branch Chief

cc: Lynnette C. Fallon (978) 787-4090