



DIVISION OF
CORPORATION FINANCE

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

July 6, 2010

Paul V. Maier
Chief Financial Officer
Sequenom, Inc.
3595 John Hopkins Court
San Diego, California 92121

Re: Sequenom, Inc.
Form 10-K for the year ended December 31, 2009
Filed March 16, 2010
File No. 000-29101

Dear Mr. Maier:

We have reviewed your supplemental correspondence dated June 15, 2010 and have the following 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 amending your filing, by providing the requested information, or by advising us when you will provide the requested response. If you do not believe our comments applies to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your filing and the information you provide in response to these comments, we may have additional comments.

Item 1. Business, page 1

Molecular Diagnostics and SEQuireDxtm Technology, page 2

1. We have reviewed your response to prior comment 2 and your related disclosure, however, it does not appear that you have fully informed your investors of the exact facts and circumstances that resulted in your no longer relying on your previously announced test data and how the protocols and controls that you adopted after your special committee completed its investigation would prevent future similar mishaps in your research and development efforts. We also note that you have not disclosed any of the findings of the special committee investigation despite the materiality of this issue to your company. We further

note that according to an SEC press release on June 2, 2010, Elizabeth Dragon, your former Senior Vice President of Research and Development, was charged by the SEC with making false statements to investors about your prenatal Down syndrome test and consented to a judgment permanently enjoining her from future violations of various sections of and rules under the Exchange Act. Given these events, please provide us with full and accurate visibility into your previous research and development missteps and how your current protocols and controls are designed to prevent future missteps and tell us how you will provide such information to your investors.

2. We have reviewed your response to prior comment 3. In addition to the disclosure you indicated you would provide in your future filings, please also discuss in your future filings the extent to which the DNA-based approach you currently have under development is proprietary to your company and clarify whether you would be able to utilize your MassARRAY platform for these tests or whether you would have to utilize a massively parallel sequencing system provided by a third party.

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.

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.

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Please contact Ruairi Regan at (202) 551-3269 or me at (202) 551-3635 with any questions.

Sincerely,

Tim Buchmiller
Senior Attorney

cc (by facsimile): D. Bradley Peck, Esq.